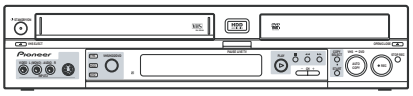
Pioneer sound.vision.soul

Service Manual



DVR-RT602H-S

ORDER NO.
RRV3429

DVD RECORDER

DVR-RT602H-S

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Model	Type	Power Requirement	Region No.	Remarks
DVR-RT602H-S	YXZT5	AC 220 V to 240 V	2	

- **When servicing this model, some service procedures may reset the customer settings to the factory default settings. Make sure to explain this to the customer.**

An HDD (Hard Disc Drive) is mounted in this product.
The HDD is a precision instrument very vulnerable to shock and electrostatic charges. Please read "7.5 Cautions on Handling the HDD" in this manual and exercise sufficient caution when handling the HDD itself, as well as the product with the HDD built in.
When an HDD becomes defective and inoperable, restoration of the user's data recorded on the HDD, or copying of the user's recorded data to other media (such as a new HDD) is totally impossible. Before servicing, OBTAIN THE USER'S PRIOR CONSENT to that effect.
The user must be made aware that all recorded data are deleted if the HDD is intialized.

For details, refer to "Important Check Points for Good Servicing" .

PIONEER CORPORATION 4-1, Meguro 1-chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O. Box 1760, Long Beach, CA 90801-1760, U.S.A.
PIONEER EUROPE NV Haven 1087, Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE. LTD. 253 Alexandra Road, #04-01, Singapore 159936

T-ZZV JUNE 2006 printed in Japan

SAFETY INFORMATION

■ LABEL CHECK

IMPORTANT

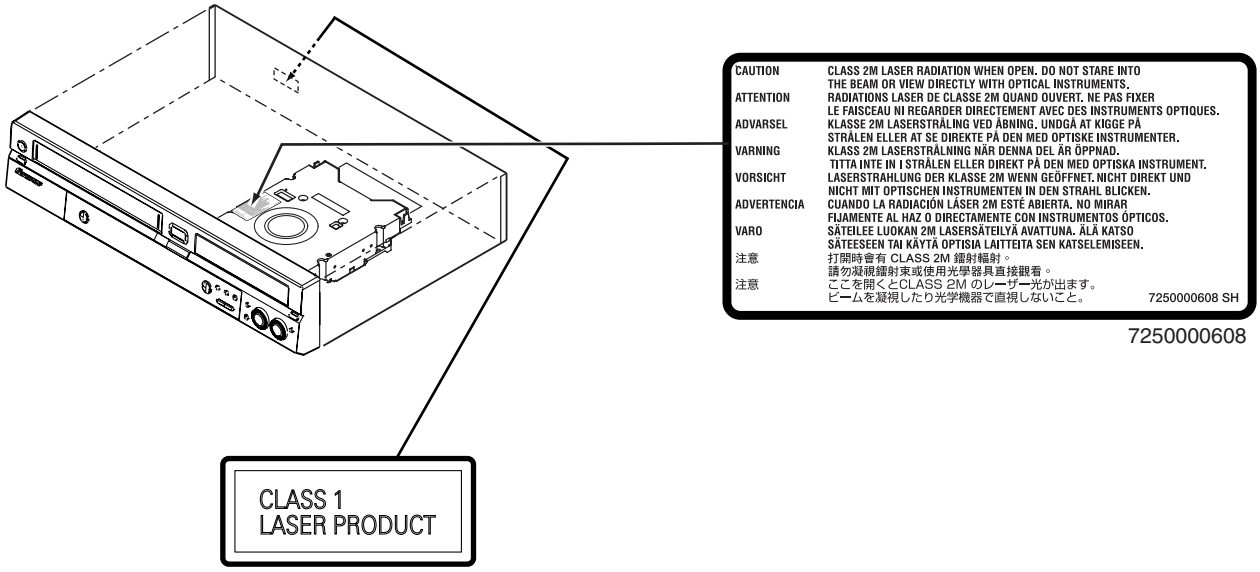
THIS PIONEER APPARATUS CONTAINS LASER OF CLASS 1.
SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

LASER DIODE CHARACTERISTICS

MAXIMUM OUTPUT POWER: 100 mW
WAVELENGTH: 654 - 662 nm

LASER DIODE CHARACTERISTICS

MAXIMUM OUTPUT POWER: 5 mW
WAVELENGTH: 770 - 810 nm



7250000608

Additional Laser Caution

1. The ON/OFF(ON:low level,OFF:high level) status of the CLAMP signals for detecting the loading state are detected by the drive CPUs, and the design prevents laser diode oscillation when the CLAMP signal turns OFF.
   In normal operation, if no disc is clamped, the laser diode oscillation is disabled.
   However, the interlock does not always operate in the test mode.

2. When the cover is opened, close viewing of the objective lens with the naked eye will cause exposure to a Class 3A laser beam.

[Important Check Points for Good Servicing]

In this manual, procedures that must be performed during repairs are marked with the below symbol.
Please be sure to confirm and follow these procedures.

1. Product safety

Please conform to product regulations (such as safety and radiation regulations), and maintain a safe servicing environment by following the safety instructions described in this manual.

① Use specified parts for repair.

Use genuine parts. Be sure to use important parts for safety.

② Do not perform modifications without proper instructions.

Please follow the specified safety methods when modification(addition/change of parts) is required due to interferences such as radio/TV interference and foreign noise.

③ Make sure the soldering of repaired locations is properly performed.

When you solder while repairing, please be sure that there are no cold solder and other debris.
Soldering should be finished with the proper quantity. (Refer to the example)

④ Make sure the screws are tightly fastened.

Please be sure that all screws are fastened, and that there are no loose screws.

⑤ Make sure each connectors are correctly inserted.

Please be sure that all connectors are inserted, and that there are no imperfect insertion.

⑥ Make sure the wiring cables are set to their original state.

Please replace the wiring and cables to the original state after repairs.
In addition, be sure that there are no pinched wires, etc.

⑦ Make sure screws and soldering scraps do not remain inside the product.

Please check that neither solder debris nor screws remain inside the product.

⑧ There should be no semi-broken wires, scratches, melting, etc. on the coating of the power cord.

Damaged power cords may lead to fire accidents, so please be sure that there are no damages.
If you find a damaged power cord, please exchange it with a suitable one.

⑨ There should be no spark traces or similar marks on the power plug.

When spark traces or similar marks are found on the power supply plug, please check the connection and advise on secure connections and suitable usage. Please exchange the power cord if necessary.

⑩ Safe environment should be secured during servicing.

When you perform repairs, please pay attention to static electricity, furniture, household articles, etc. in order to prevent injuries.
Please pay attention to your surroundings and repair safely.

2. Adjustments

To keep the original performance of the products, optimum adjustments and confirmation of characteristics within specification.
Adjustments should be performed in accordance with the procedures/instructions described in this manual.

3. Lubricants, Glues, and Replacement parts

Use grease and adhesives that are equal to the specified substance.
Make sure the proper amount is applied.

4. Cleaning

For parts that require cleaning, such as optical pickups, tape deck heads, lenses and mirrors used in projection monitors, proper cleaning should be performed to restore their performances.

5. Shipping mode and Shipping screws

To protect products from damages or failures during transit, the shipping mode should be set or the shipping screws should be installed before shipment. Please be sure to follow this method especially if it is specified in this manual.

CONTENTS

1. SPECIFICATIONS

General

Power requirements . . . . 220 V to 240 V, 50 Hz / 60 Hz
Power consumption . . . . . 50 W
Power consumption in standby mode. . . . . 0.9 W
(Front panel display: off)
Weight . . . . . .6.0 kg
Dimensions . . . 430 mm (W) x 91 mm (H) x 367 mm (D)
Operating temperature . . . . . +5°C to +35 °C
Operating humidity . . . . . 5 % to 85 %
(no condensation)
TV system. . . . . PAL/SECAM/
NTSC (external input only)

Readable discs
DVD-Video, DVD-RW, DVD-R, DVD+R, DVD+RW, DVD-RAM, Video CD, Super VCD, CD, CD-R/-RW (WMA, MP3, JPEG, CD-DA)

Recording discs and formats
DVD-R/-RW: VR mode and Video mode
DVD+R/+RW: +VR mode
DVD-RAM: VR mode
DVD-R DL: VR mode and Video mode
DVD+R DL: +VR mode

Video recording format
Sampling frequency . . . . . .13.5 MHz
Compression format. . . . . MPEG
Audio recording format
Sampling frequency. . . . . 48 kHz
Compression format. . . . . Dolby Digital or Linear PCM
(uncompressed)

Recording time
HDD (80 GB)
Fine (XP) . . . . . Approx. 17 h
Standard Play (SP). . . . . Approx. 34 h
Long Play (LP) . . . . . Approx. 68 h
Extended Play (EP) . . . . . Approx. 102 h
Super Long Play (SLP). . . . . Approx. 136 h
Super Extended Play (SEP). . . . . Approx. 170 h
Manual Mode (MN). . . . . Approx. 17 h to 227 h

DVD-R/-RW, DVD+R/+RW, DVD-RAM
Fine (XP). . . . . Approx. 1 h
Standard Play (SP). . . . . Approx. 2 h
Long Play (LP) . . . . . Approx. 4 h
Extended Play (EP) . . . . . Approx. 6 h
Super Long Play (SLP). . . . . Approx. 8 h
Super Extended Play (SEP). . . . . Approx. 10 h
(DVD-R/-RW, DVD-RAM only)
Manual Mode (MN)
DVD-R/-RW/-RAM. . . . . Approx. 1 h to 13 h
DVD+R/+RW. . . . . Approx. 1 h to 8 h

DVD-R DL/DVD+R DL
Fine (XP) . . . . . Approx. 1 h 51 m
Standard Play (SP) . . . . . Approx. 3 h 35 m
Long Play (LP). . . . . Approx. 7 h 11 m
Extended Play (EP). . . . . Approx. 10 h 46 m
Super Long Play (SLP) . . . . . Approx. 14 h 21 m
Super Extended Play (SEP) . . . . . Approx. 17 h 57 m
(DVD-R DL only)
Manual Mode (MN)
DVD-R DL. . . . . Approx. 1 h 51 m to 24 h
DVD+R DL .. . . . . Approx. 1 h 51 m to 14 h 21 m

Timer

Programs . . . . . 1 month/32 programs
Clock. . . . . Quartz lock (24-hour digital display)

Tuner

Receivable channels

	SECAM B/G PAL B/G		PAL I	
	Frequency	Channel	Frequency	Channel
VHF (low)	47 MHz to 89 MHz	E2 to E4 X to Z	44 MHz to 89 MHz	A to C X to Z
VHF (high)	104 MHz to 300 MHz	E5 to E12 S1 to S20 M1 to M10 U1 to U10	104 MHz to 300 MHz	D to J 11, 13 S1 to S20
Hyper	302 MHz to 470 MHz	S21 to S41	302 MHz to 470 MHz	S21 to S41
UHF	470 MHz to 862 MHz	E21 to E69	470 MHz to 862 MHz	E21 to E69

	SECAM L		SECAM D/K PAL D/K	
	Frequency	Channel	Frequency	Channel
VHF (low)	49 MHz to 65 MHz	FB, FC1, FC	49 MHz to 94 MHz	R1 to R5
VHF (high)	104 MHz to 300 MHz	F1 to F6 B to Q	104 MHz to 300 MHz	R6 to R12 S1 to S20
Hyper	300 MHz to 470 MHz	S21 to S41	302 MHz to 470 MHz	S21 to S41
UHF	470 MHz to 862 MHz	21 to 69	470 MHz to 862 MHz	E21 to E69

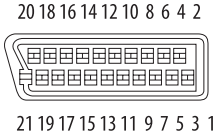
STEREO
B/G - A2
I - NICAM
L - NICAM
B/G - NICAM
D/K - NICAM

Input/Output

VHF/UHF antenna input/output terminal
. . . . . VHF/UHF set 75 Ω (IEC connector)
Video input . . . . . Input 1 (rear), Input 2 (front)
Input level . . . . . .1 Vp-p (75 Ω)
Jacks . . . . . AV connector 2 (Input 1), RCA jack (Input 2)
Video output . . . . . AV1, Output
Output level. . . . . .1 Vp-p (75 Ω)
Jacks . . . . . AV connector (AV1) RCA jack (Output)
S-Video input . . . . . Input 1 (rear), Input 2 (front)
Y (luminance) - Input level. . . . . 1 Vp-p (75 Ω)
C (colour) - Input level . . . . . 300 mVp-p (75 Ω)
Jacks . . . . . AV connector 2 (Input 1), 4 pin mini DIN (Input 2)
S-Video output . . . . . AV1, Output (HDD/DVD only)
Y (luminance) - Output level . . . . . .1 Vp-p (75 Ω)
C (colour) - Output level . . . . . 300 mVp-p (75 Ω)
Jacks . . . . . AV connector 1 (AV1), 4 pin mini DIN (Output)
Component video output
Output level. . . . . Y: 1.0 Vp-p (75 Ω)
P_B, P_R: 0.7 Vp-p (75 Ω)
Jacks. . . . . RCA jacks
RGB input (HDD/DVD only)
Input level . . . . . 0.7 Vp-p (75 Ω)
Jacks. . . . . AV connector 2 (Input 1)
RGB output (HDD/DVD only)

Output level. . . . . 0.7 Vp-p (75 Ω)
Jacks . . . . . .AV connector 1 (AV1)
Audio input. . . . . Input 1 (rear), Input 2 (front) L/R
Input level
During audio input. . . . . 2 V rms (Input impedance: more than 22 kΩ)
Jacks . . . . . AV connector 2 (Input 1), RCA jacks (Input 2)
Audio output . . . . . AV1, Output
During audio output. . . . . 2 V rms (Output impedance: less than 1.5 kΩ)
Jacks . . . . . AV connector 1 (AV1), RCA jacks (Output)
Audio output . . . . . Output (HDD/DVD only)
During audio output. . . . . 2 V rms (Output impedance: less than 1.5 kΩ)
Jacks. . . . . RCA jacks (Output)
Control input. . . . . Mini jack
Digital audio ouptut. . . . . Coaxial
G-LINK™ . . . . . Mini jack

AV Connectors (21-pin connector assignment)
AV connector input/output . . . . . 21-pin connector
This connector provides the video and audio signals for connection to a compatible colour TV or monitor.



PIN no.	AV1(RGB)-TV / AV2(INPUT 1)
1	Audio 2/R out / Audio 2/R out
2	- / Audio 2/R in
11	G out / G in
3	Audio 1/L out / Audio 1/L out
6	- / Audio 1/L in
15	R or C out / R or C in
4	GND
17	GND
7	B out / B in
19	Video out or Y out / Video out
20	- / Video in or Y in
8	Status
21	GND

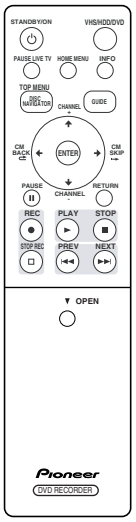
Supplied accessories

Remote control 1
Dry cell batteries (AA/R6P). 2
Audio / Video cable (red/white/yellow) 1
G-LINK™ cable. 1
RF antenna cable. 1
Power cable 1
Operating Instructions
Warranty card 1

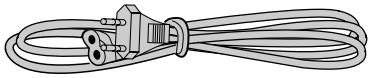
Note: The specifications and design of this product are subject to change without notice, due to improvement.

● Accessories

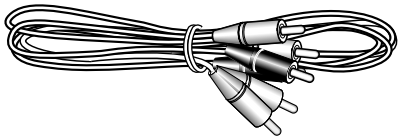
• Remote Control ×1
(07660ML010)



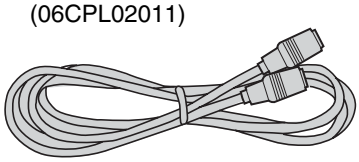
• Power cable ×1
(1206158802)



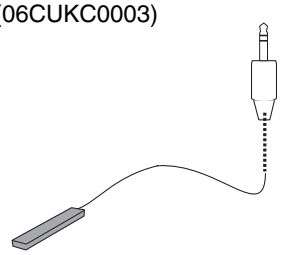
• Audio / Video cable(1.5m) ×1
(red/white/yellow)
(06CPBA2006)



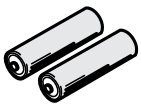
• RF Antenna cable ×1
(06CPL02011)



• G-Link cable ×1
(06CUKC0003)



• Dry cell batteries ×2
(AAA/R03)



• Operating Instructions

A

B

C

D

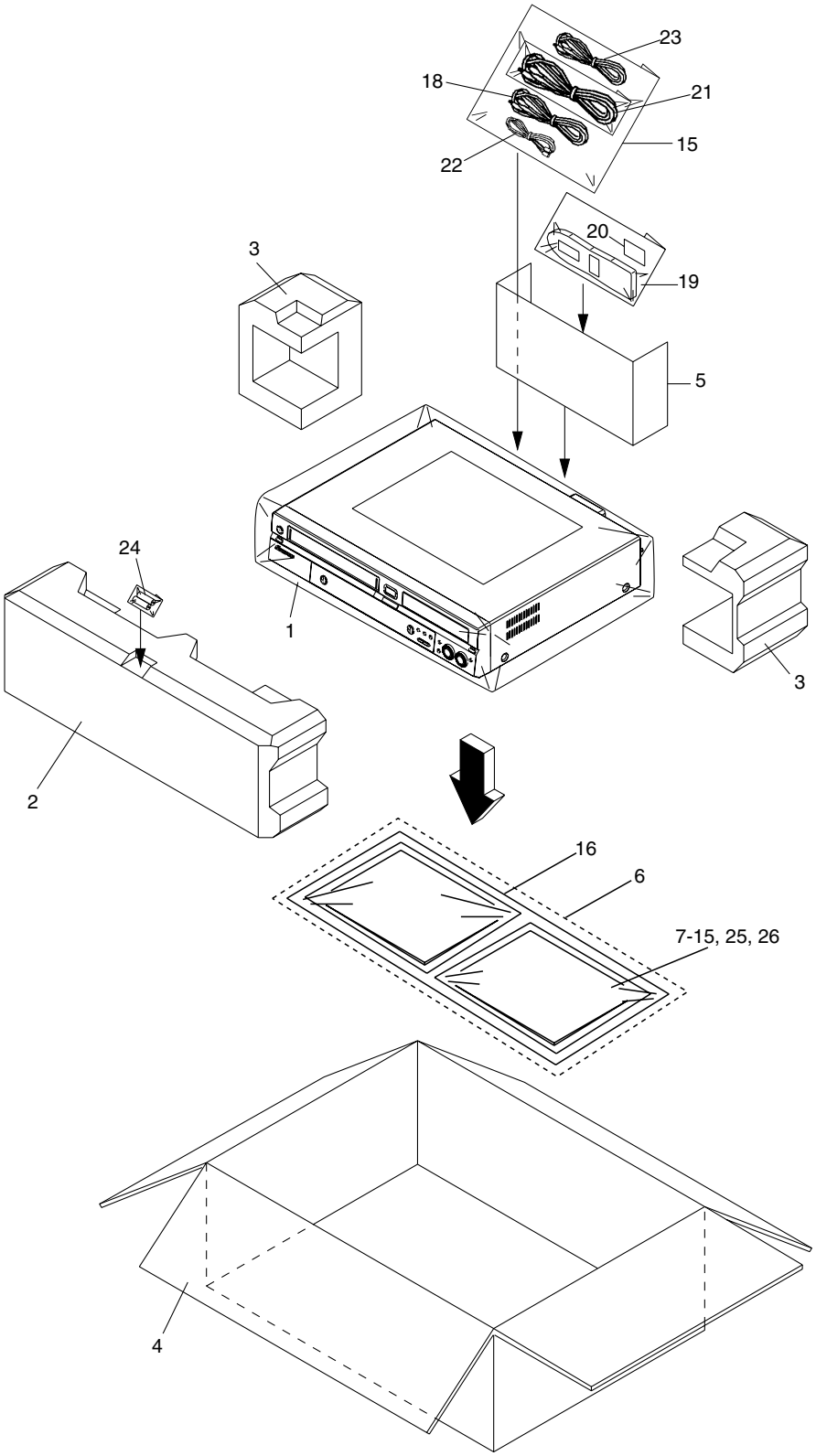
E

F

2. EXPLODED VIEWS AND PARTS LIST

NOTES:
- *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Screws adjacent to ▼ mark on product are used for disassembly.*
- *For the applying amount of lubricants or glue, follow the instructions in this manual. (In the case of no amount instructions, apply as you think it appropriate.)*

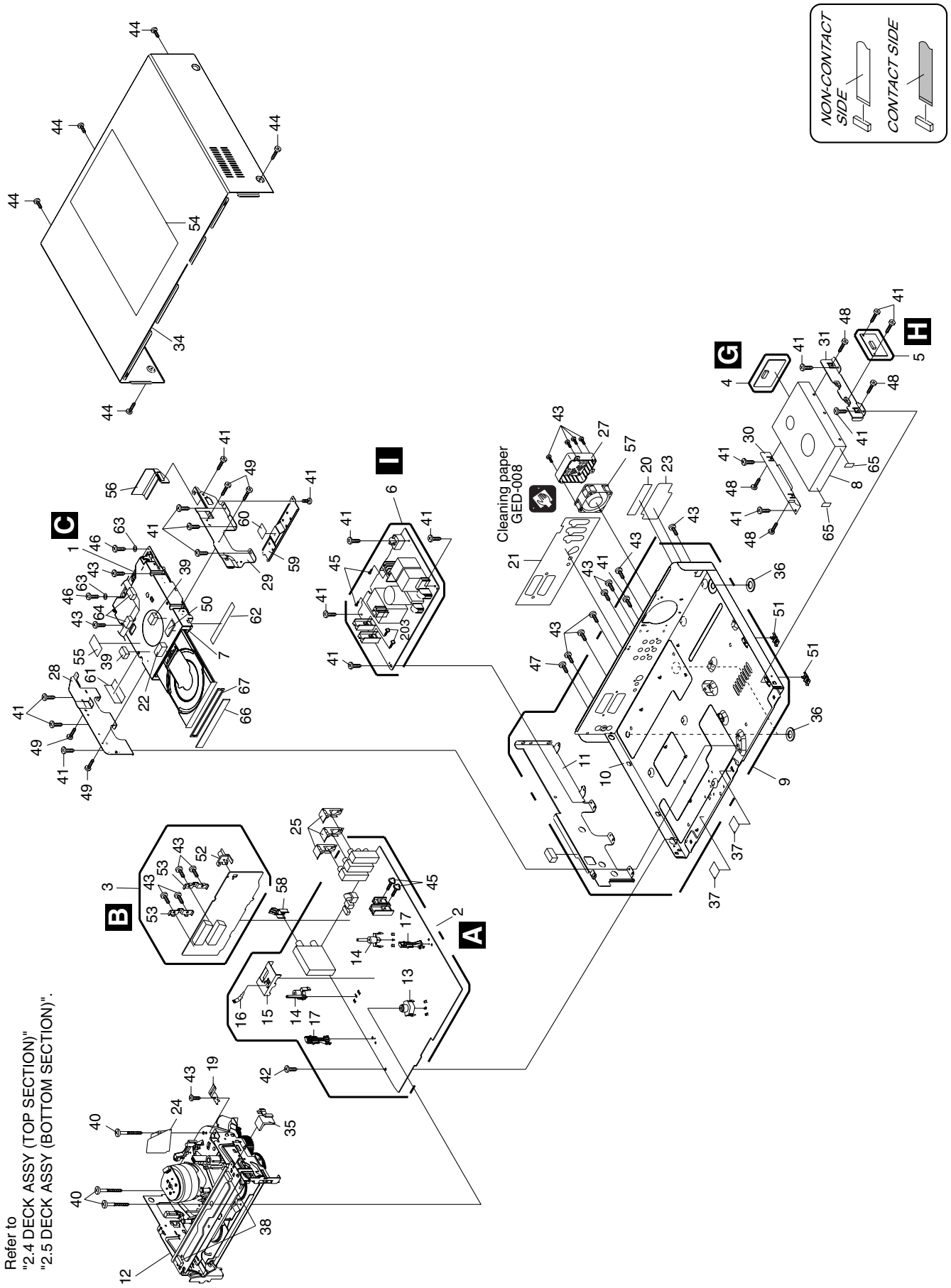
2.1 PACKING



PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Gift Sheet	791WHA0100
	2	Package, Front	792WHA0694
	3	Package, Back	792WHA0659
	4	Gift, Box	793WCD1765
	5	Pad	795WCA0688
NSP	6	Instruction Book Kit	A2J602A975
	7	Operating Instructions (French)	J2J60211A
	8	Operating Instructions (German)	J2J60212A
	9	Operating Instructions (Spanish)	J2J60213A
	10	Operating Instructions (Italian)	J2J60214A
	11	Operating Instructions (Dutch)	J2J60215A
	12	Information Sheet	J2H70129A
	13	Guarantee Card	J2J60202A
	14	Polyethylene Bag	JA5ND400
	15	Polyethylene Bag	JA5ND300
	16	Long Polyethylene Bag	JA3ND200
	17	••••••••	
⚠	18	Power Cable	1206158802
	19	Remote Control	07660ML010
	20	Battery Cover	VZN1004
	21	Audio/Video Cable	06CPBA2006
	22	RF Antenna Cable	06CPL02011
	23	G-Link Cablle	06CUKC0003
NSP	24	Battery (AAA/03)	141L003010
	25	Information Sheet	J2J60229A
	26	Information Sheet (HDD:Caution)	J2J60249A

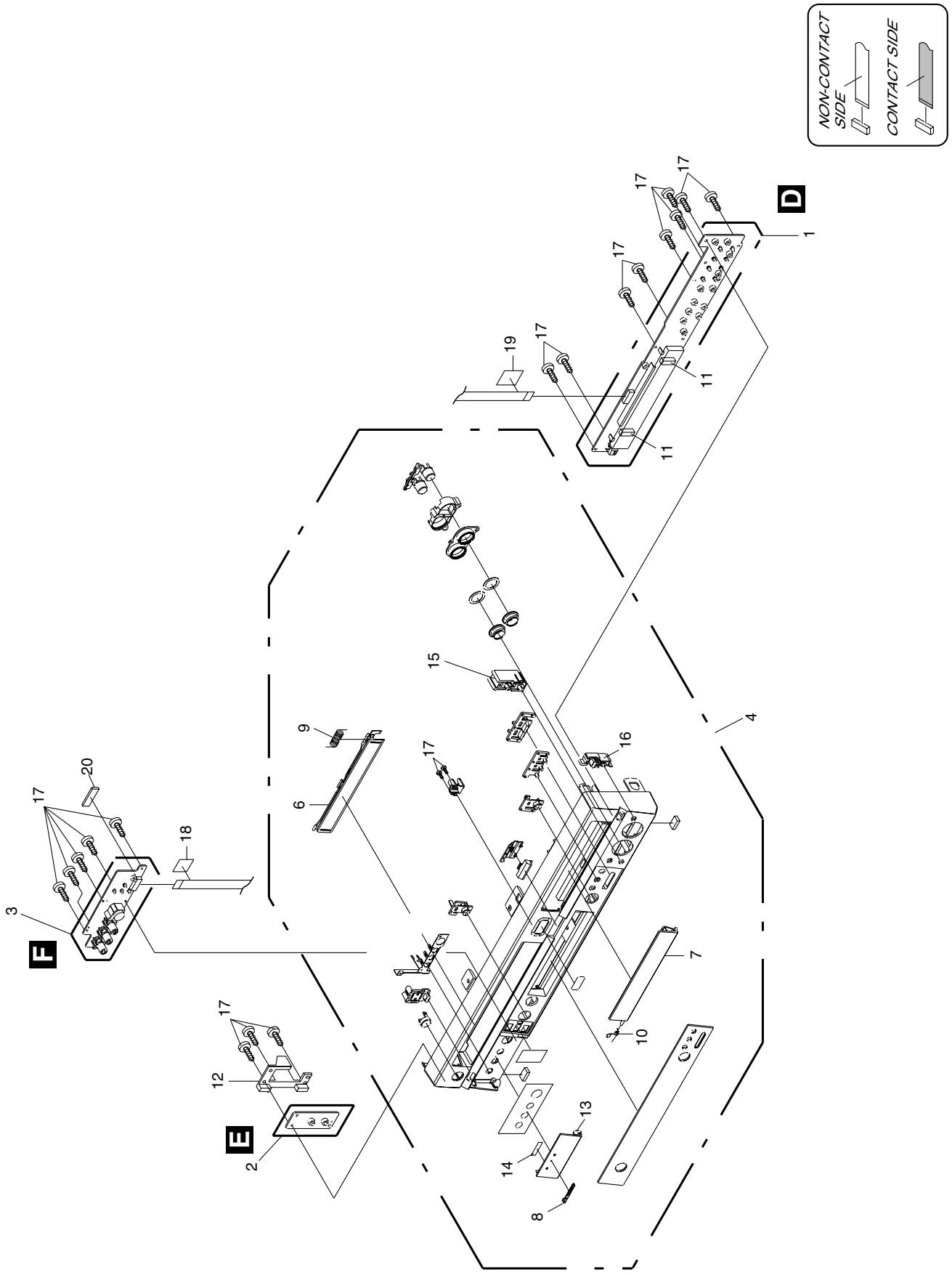
2.2 EXTERIOR SECTION



EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	SERVICE MAIN ASSY	VXX3161
	2	SERVICE VCR ASSY	VXX3190
	3	AV PCB ASSY	A2J602AD20
	4	RELAY 1 PCB ASSY	A2J602ADB0
	5	RELAY 2 PCB ASSY	A2J602ADC0
	6	POWER PCB ASSY	A2J602A240
	7	SERVICE LOADER ASSY	VXX3156
	8	HDD 80G WD800BBJKC S	VXF1066
NSP	9	BOTTOM CABI ASS'Y	7G7610056A
NSP	10	PLATE,BOTTOM	761WSA0381
NSP	11	ANGLE,CENTER	761WSA0367
	12	DECK ASSY	A2J602A420A
	13	HOLDER,DECK	701WPA1363
	14	HOLDER,DECK	701WPA1364
	15	SHIELD,CASE HEAD AMP	752WSA0230
	16	SPRING,EARTH HEAD AMP	753WUAA006
	17	HOLDER,END SENSOR	85OP700038
	18	••••••••	
	19	SPRING,EARTH-TOP	753WUA0080
NSP	20	SHEET,SERIAL	7220001204
NSP	21	SHEET,JACK	7230008145
	22	CUSHION,TOP	800WFA0075
NSP	23	SHEET,RATING	7236310038
	24	COVER,AC HEAD	752WSA0275
	25	SHIELD,COMPO	752WSA0613
	26	••••••••	
	27	HOLDER,FAN	761WPAA139
NSP	28	ANGLE,DVD(L)	761WSA0368
NSP	29	ANGLE,DVD(R)	761WSA0369
NSP	30	ANGLE, HDD(L)	761WSA0398
NSP	31	ANGLE, HDD(R)	761WSA0399
	32	••••••••	
	33	••••••••	
	34	CABINET,TOP	702WSB0123
	35	HOLDER,TOP	761WPA0384
	36	CUSHION FAI	800WR00070
	37	SHEET	7230008029
	38	CUSHION 65TS10-5	8965TS1015
	39	CUSHION 65TS10-10	8965TS1017
	40	SCREW,TAP TITE(B) R PAN	8109130B7U
	41	SCREW,TAP TITE(B) R BIND	810923070U
	42	SCREW,TAP TITE(B) R BIND	810923053U
	43	SCREW,TAP TITE(B) BIND	810923080U
	44	SCREW,TAP TITE(B) BIND(3D)	8109K3060U
	45	SCREW,TAP TITE(B) WH7	8109I30A0U
	46	SCREW,TAP TITE(B)-R BIND	816323075U
	47	SCREW,TAP TITE(B) BIND	810723040U
	48	SCREW NO.6-32UNC PAN L=5	815316325U
	49	SCREW,BIND	810223060U
	50	CUSHION	800WFAA025
	51	COVER, BOTTOM	713WPA0403
	52	HOLDER, PCB	761WPAA141
	53	HOLDER, 21PIN	761WSA0290
	54	SHEET, INFOMATION	7230008025
	55	SHEET, CAUTION	7250000608
	56	COVER, FFC	761WPA0446
	57	FAN MOTOR	1519456L05
	58	SPRING, TUNER	744WSA0003
	59	HEAT SINK	763WSA0060
	60	SHEET, SILICONE	800WR00081
	61	ALUMINUM TAPE 25x25	VEF1060
	62	TAPE	890MP2401I
	63	WASHER	82A308005U
	64	CUSHION	800WFA0096
	65	FELT SHEET	800WQ00119
	66	TRAY PANEL OR	DAH2453
	67	TRAY SHEET OR	DEB1791

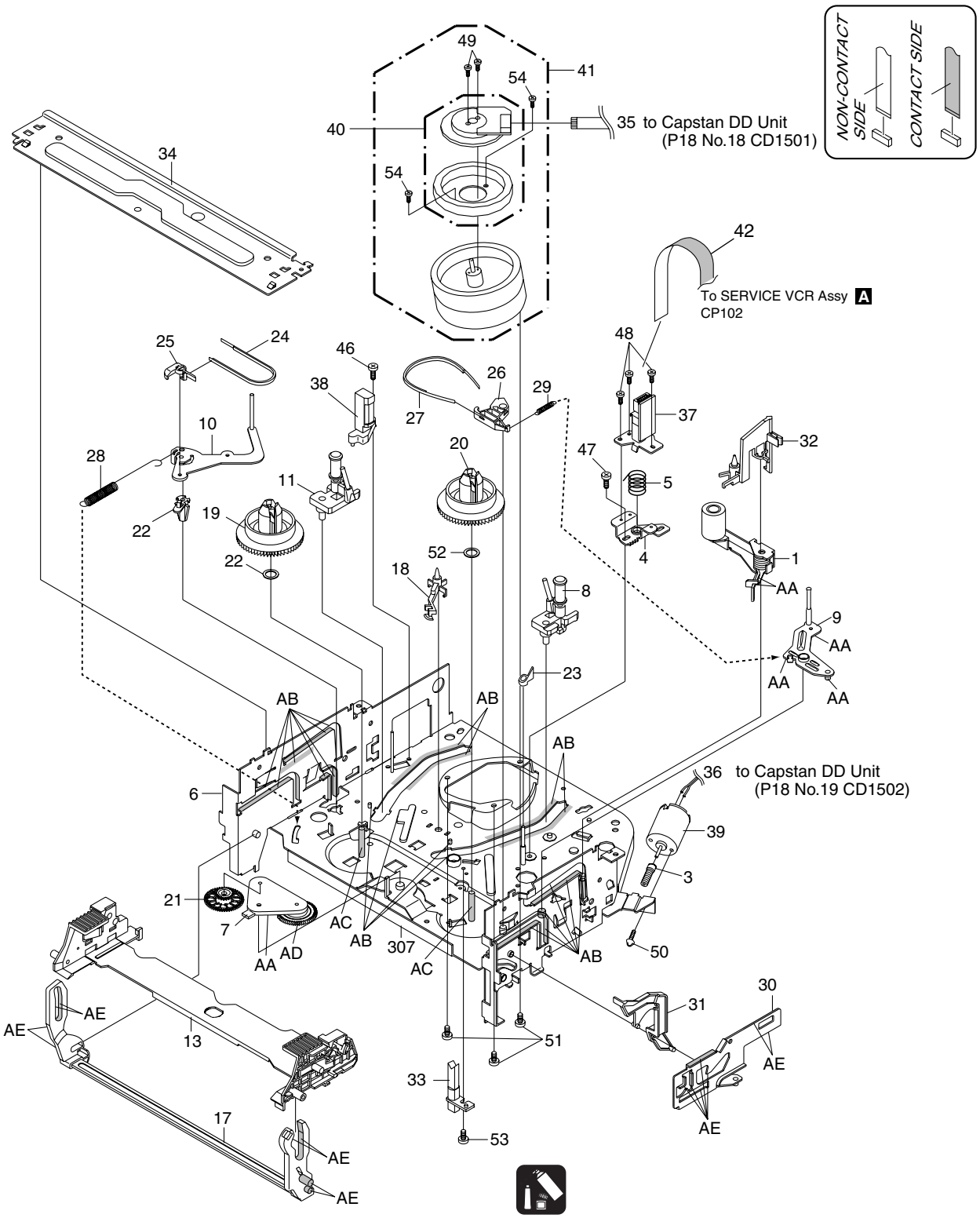
2.3 FRONT PANEL SECTION



FRONT PANEL SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	DISPLAY PCB ASSY	A2J602ADP0
	2	OPERATION 1 PCB ASSY	A2J602A270
	3	OPERATION 2 PCB ASSY	A2J602A280
	4	FRONT CABI ASSY	7A7010228B
	5	•••••••	
	6	FLAP,VCR	712WPJC285
	7	FLAP,DVD	712WPJ0963
NSP	8	BADGE,BRAND	7236310032
	9	SPRING,FLAP	743WKA0039
	10	SPRING,FLAP-DVD	743WKA0054
	11	CUSHION	800WR00074
	12	HOLDER,DECK	761WPA0440
	13	DOOR	712WPJ0967
	14	SHEET PC	7230008168
	15	BUTTON,FRAME-DUBBING	738WPBA172
	16	BUTTON,FRAME-EJECT	738WPJA034
	17	SCREW, TAP TITE(P) BIND	8110226A0U
	18	SHEET	7230007997
	19	SHEET	7230008029
	20	CUSHION C	800WFAA008

2.4 DECK ASSY (TOP SECTION)



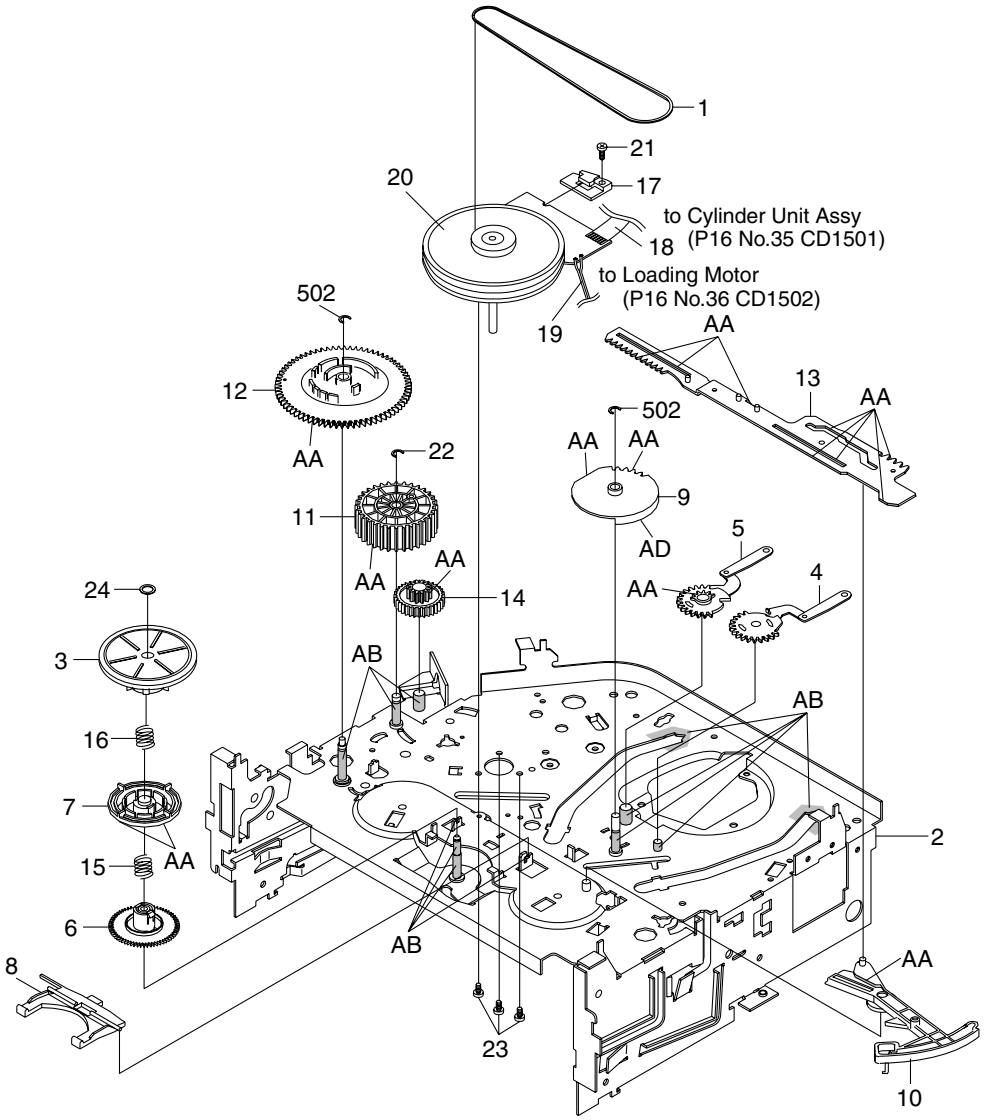
CLASS	MARK	SERVICE PART NO.
GREASE	AA	GEM1061
	AB	GEM1063
	AC	GEM1064
	AD	GEM1016
	AE	GEM1062

NOTE: Applying positions AA, AB, AC, AD and AE for the grease are displayed for this section. Check if the correct grease is applied for each position.

DECK ASSY (TOP SECTION) parts List

Mark	No.	Description	Part No.
	1	Pinch Roller Block VA2	85OA400245
	2	•••••••	
	3	Worm	85OP600581
	4	Base, AC Head	85OP500091
	5	Spring, AC Head	85OP800324
	6	Main Chassis Assy	85OA000529
	7	Arm Idler Assy	85OA200092
	8	Inclined Base T Unit 3S	85OA400223
	9	P5 Arm Assy 2	85OA400249
	10	Tension Arm Assy 2	85OA400248
	11	Inclined Base S Unit	85OA400231
	12	•••••••	
	13	Cass, Holder Assy	85OA900236
	14	•••••••	
	15	•••••••	
	16	•••••••	
	17	Link Unit	85OA900233
	18	Post, Cass Guide	85OP000496
	19	Reel, S (S)	85OP200316
	20	Reel, T (S)	85OP200317
	21	Gear, Idler	85OP200308
	22	Holder, Tension	85OP400492
	23	Cap. P4	85OP400520
	24	Band, Tension	85OP400542
	25	Connect, Tension	85OP400533
	26	Arm, Brake T	85OP600573
	27	Band, Brake T	85OP600584
	28	Spring, Tension	85OP800322
	29	Spring, Brake T	85OP800360
	30	Lever, Link	85OP900754
	31	Lever, Flap	85OP900759
	32	Cass, Opener	85OP900745
	33	Reflector, LED	85OP700035
	34	Bracket, Top	85OP900756
	35	Cord Jumper (CD1501)	122H071603
	36	Cord Jumper (CD1502)	122Y021902
	37	Head (Audio Control)(H5001)	1523Q91004
	38	Head (Full Erase)(H5002)	1543Q02014
⚠	39	Motor, Loading (M101)	1596S98002
	40	Micro Motor (M2003)	1589S11025
⚠	41	Cylinder Unit Assy (UN4001)	A2H301T500
	42	Cord Jumper (CD102)	122F041508
	43	•••••	
	44	•••••	
	45	•••••	
	46	Screw	810722680U
	47	Screw	810722640U
	48	Screw	810212060U
	49	Screw	810912660U
	50	Screw/Washer (A)	810A13040U
	51	Screw/Washer (A)	810A12650U
	52	Polyslider Washer	82Q264713N
	53	Screw	810722660U

2.5 DECK ASSY (BOTTOM SECTION)



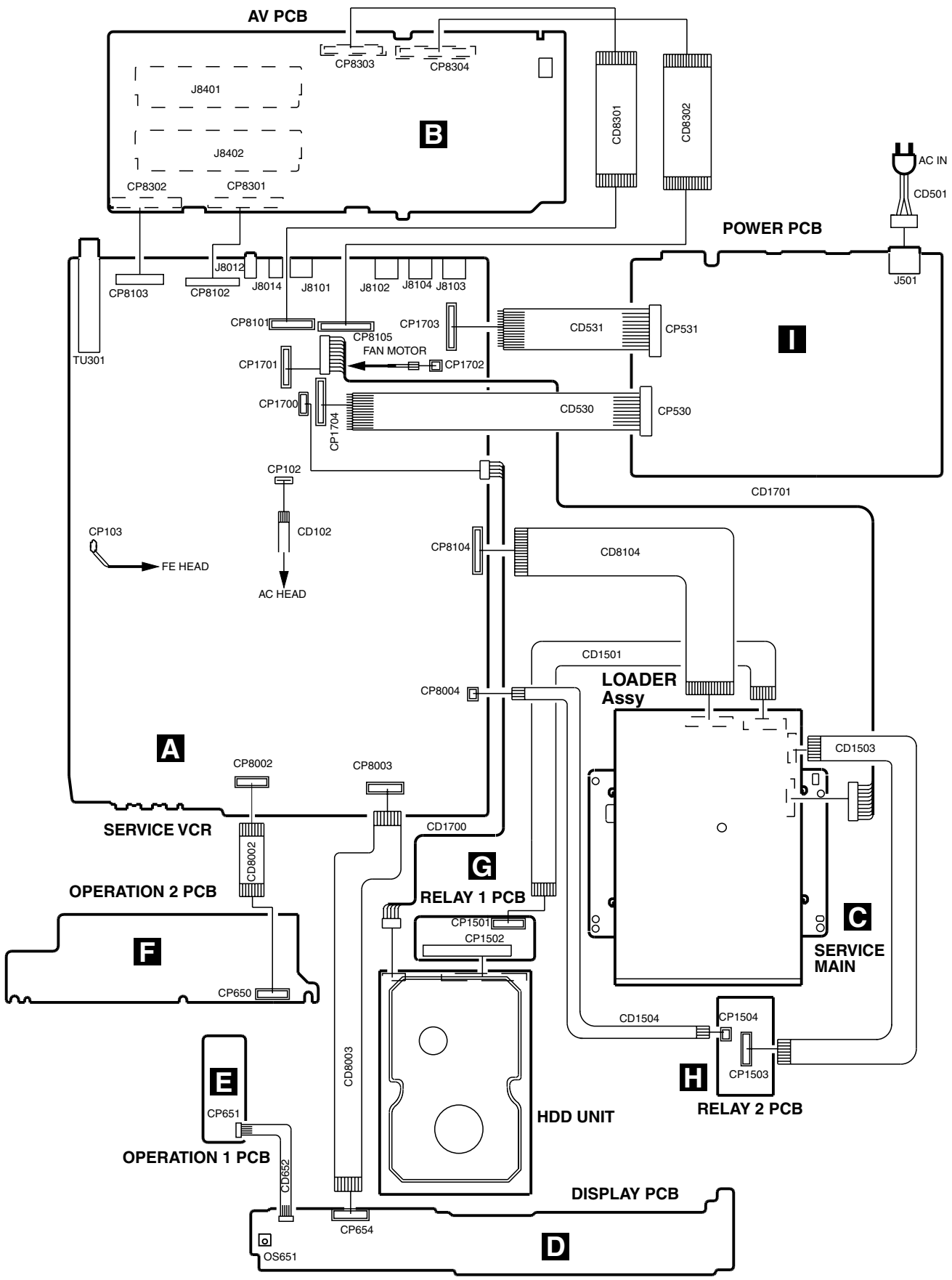
CLASS	MARK	SERVICE PART NO.
GREASE	AA	GEM1061
	AB	GEM1063
	AC	GEM1064
	AD	GEM1016
	AE	GEM1062

NOTE: Applying positions AA, AB, AC, AD and AE for the grease are displayed for this section. Check if the correct grease is applied for each position.

DECK ASSY (BOTTOM SECTION) parts List

Mark	No.	Description	Part No.
	1	Belt, Capstan (S)	85OP200290
	2	Main Chassis Assy	85OA000529
	3	Clutch Assy	85OA200089
	4	Loading Arm S Unit	85OA300068
	5	Loading Arm T Unit	85OA300070
	6	Gear, Clutch	85OP200311
	7	Gear, Coupling	85OP200312
	8	Lever, Clutch	85OP200313
	9	Gear, Main Loading	85OP300194
	10	Lever, Tension	85OP400490
	11	Cam, Pinch Roller	85OP600577
	12	Cam, Main	85OP600578
	13	Rod, Main	85OP600585
	14	Gear, Joint	85OP600582
	15	Spring, Coupling	85OP800355
	16	Spring, Ring	85OP800356
	17	Holder, Capstan	85OP400554
	18	Cord Jumper (CD1501)	122H071603
	19	Cord Jumper (CD1502)	122Y021902
⚠	20	Capstan DD Unit (M2001)	1510S98045
	21	Screw, Tap Tite(S) Bind	810722680U
	22	E-Ring	83ETW3000U
	23	Screw	810912660U
	24	Polyslider Washer	82P184505N

2.6 WIRING CABLE



A

B

C

D

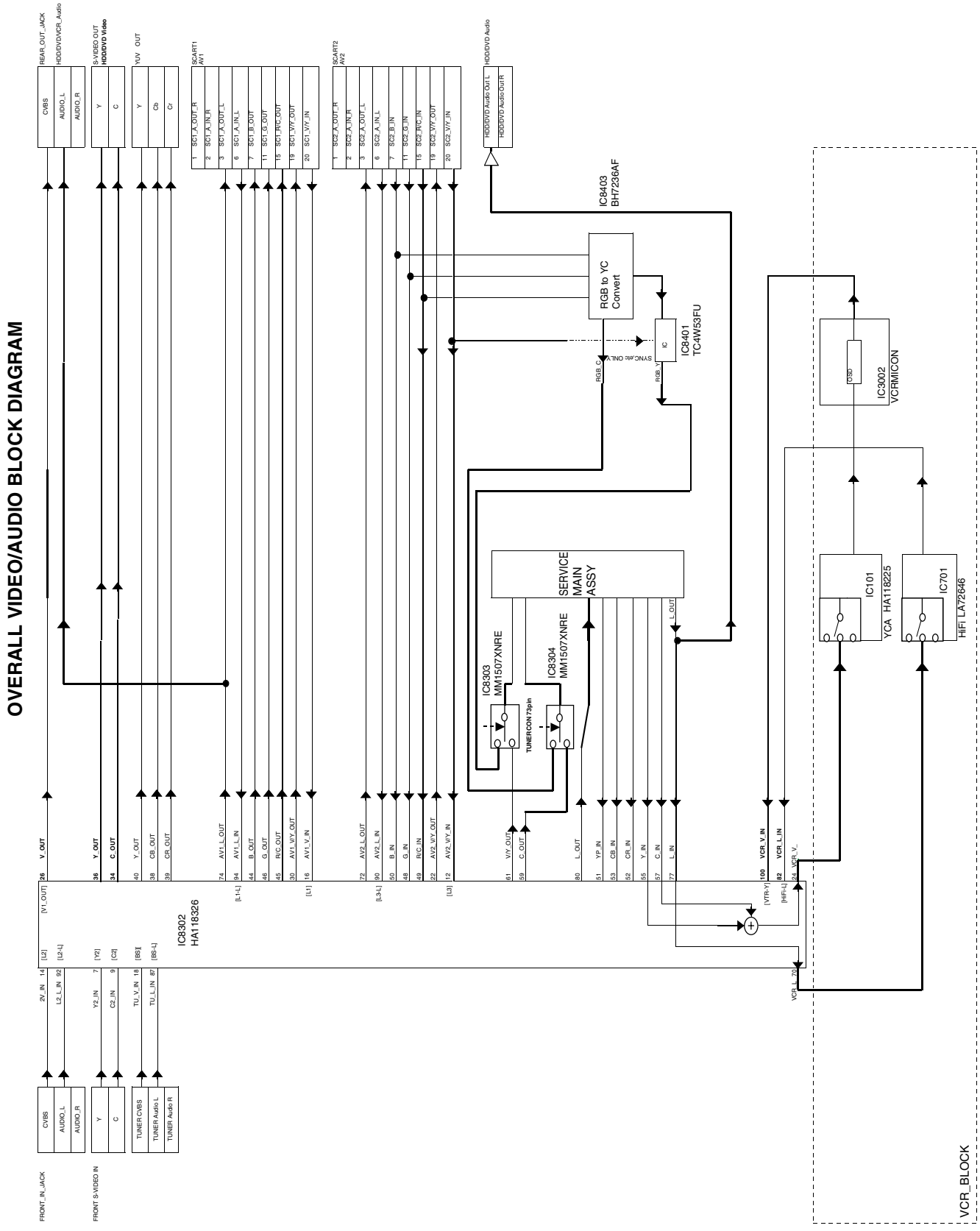
E

F

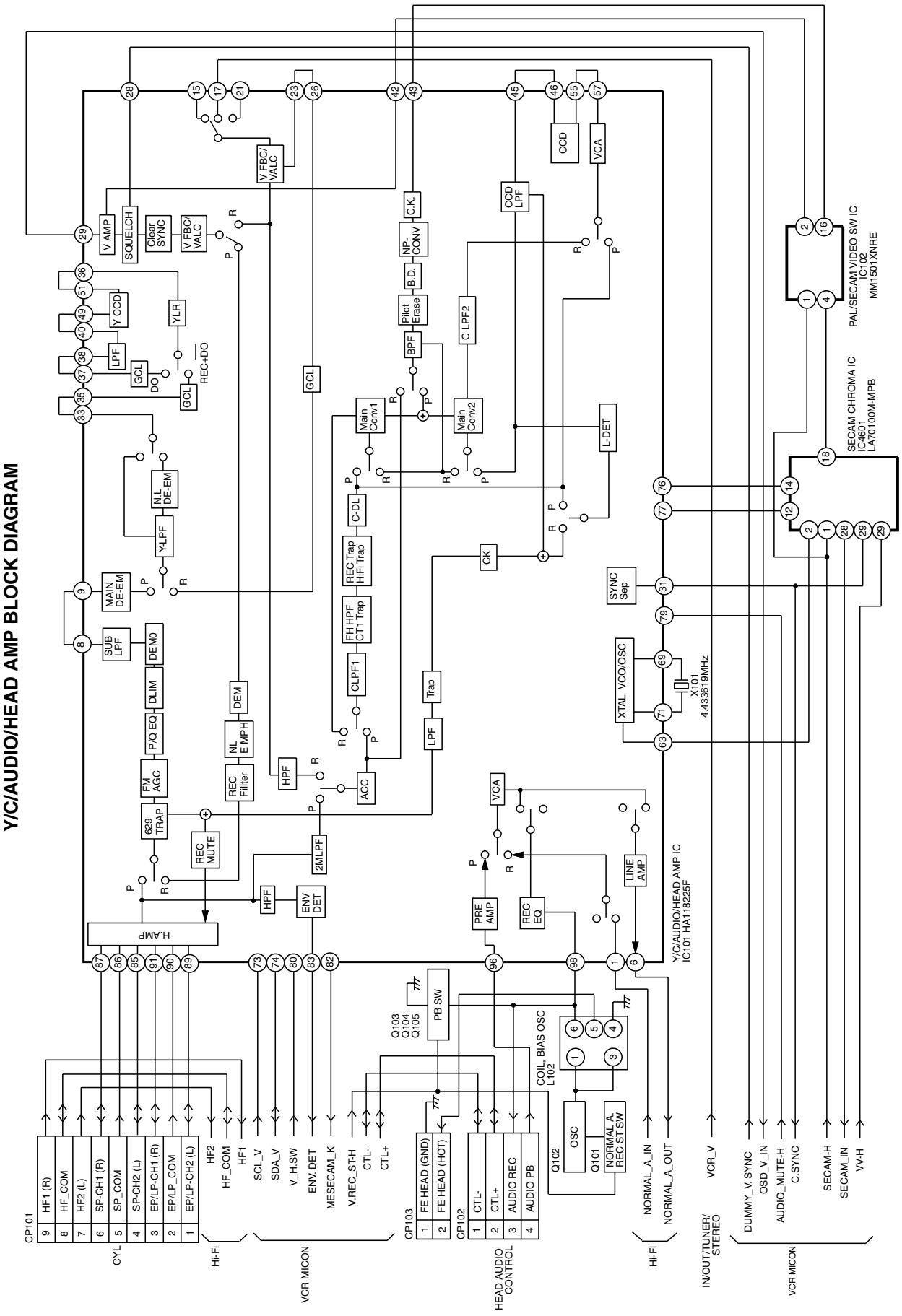
3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM

3.1.1 OVERALL BLOCK DIAGRAM

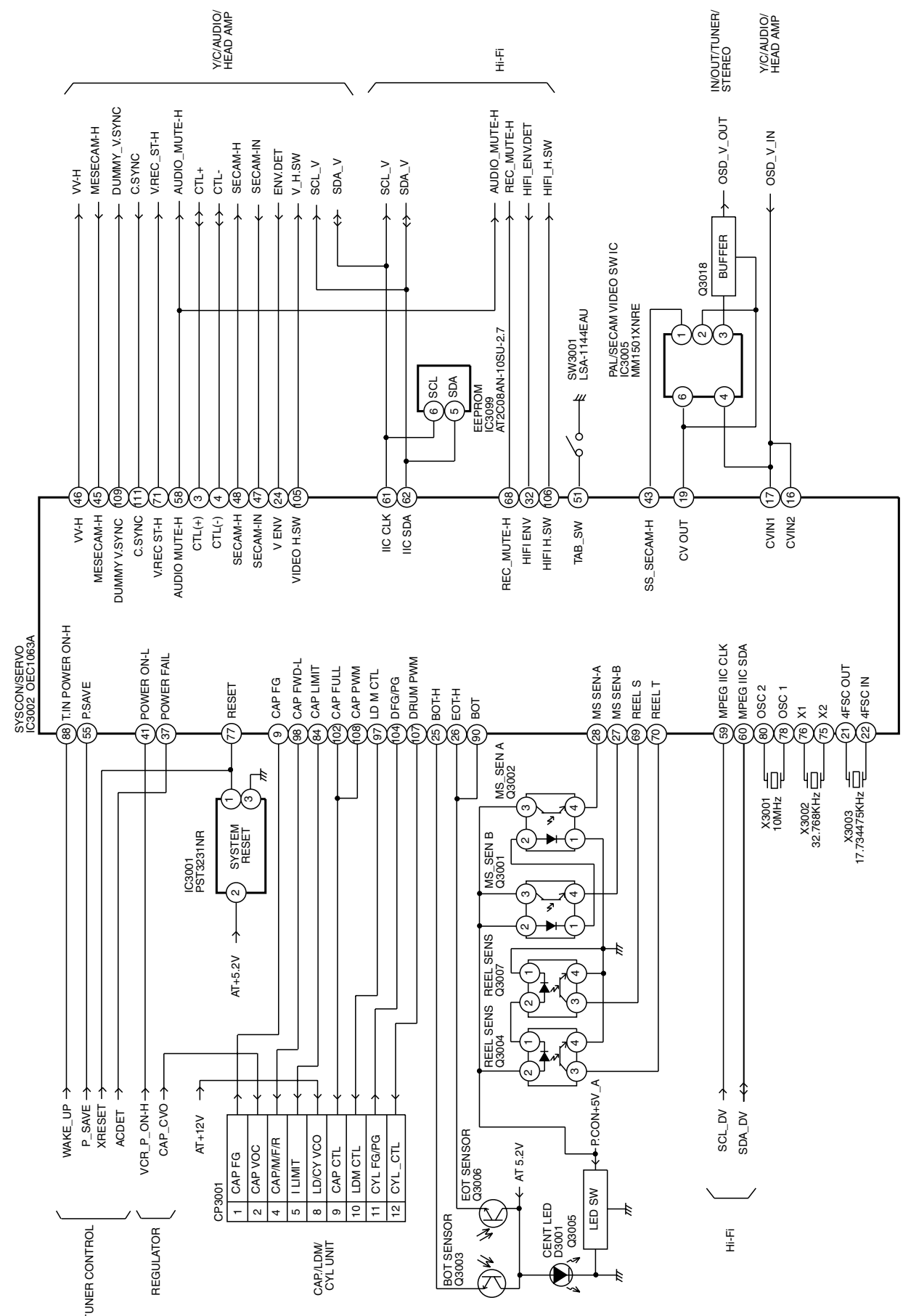


3.1.2 Y/C/AUDIO/HEAD AMP BLOCK



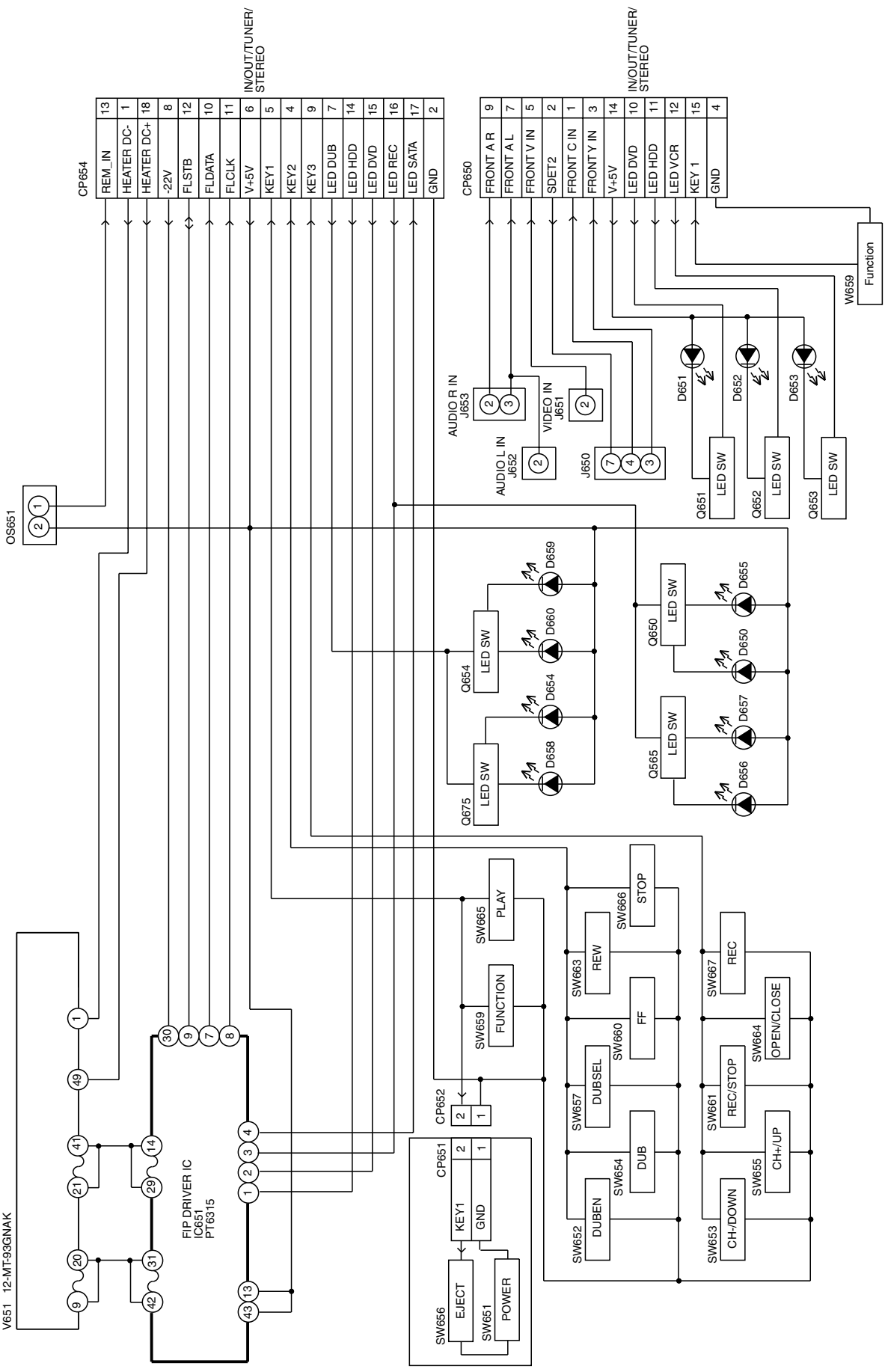
3.1.3 VCR MICON BLOCK

VCR MICON BLOCK DIAGRAM



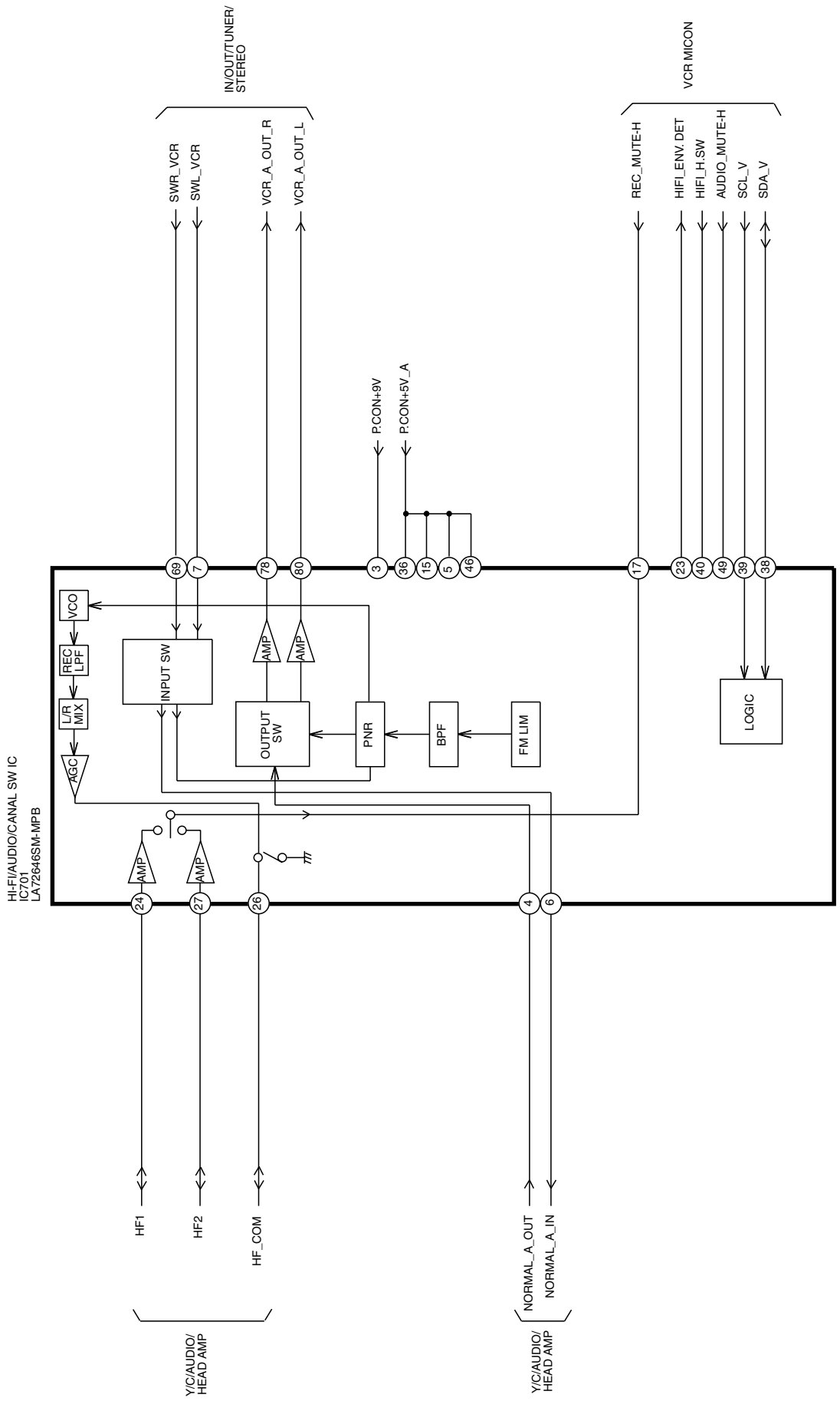
3.1.4 DISPLAY BLOCK

DISPLAY BLOCK DIAGRAM



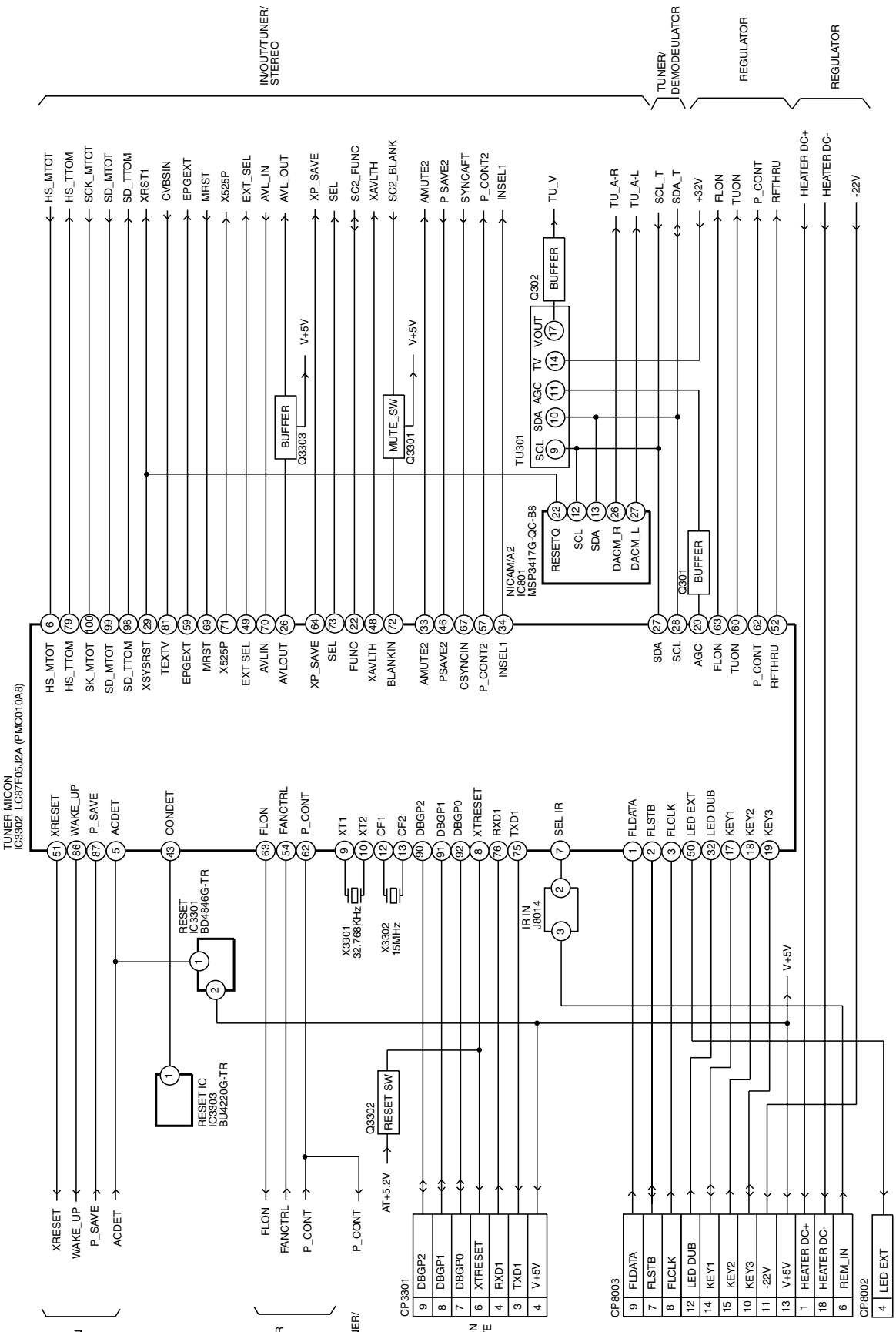
3.1.5 Hi-Fi BLOCK

Hi-Fi BLOCK DIAGRAM



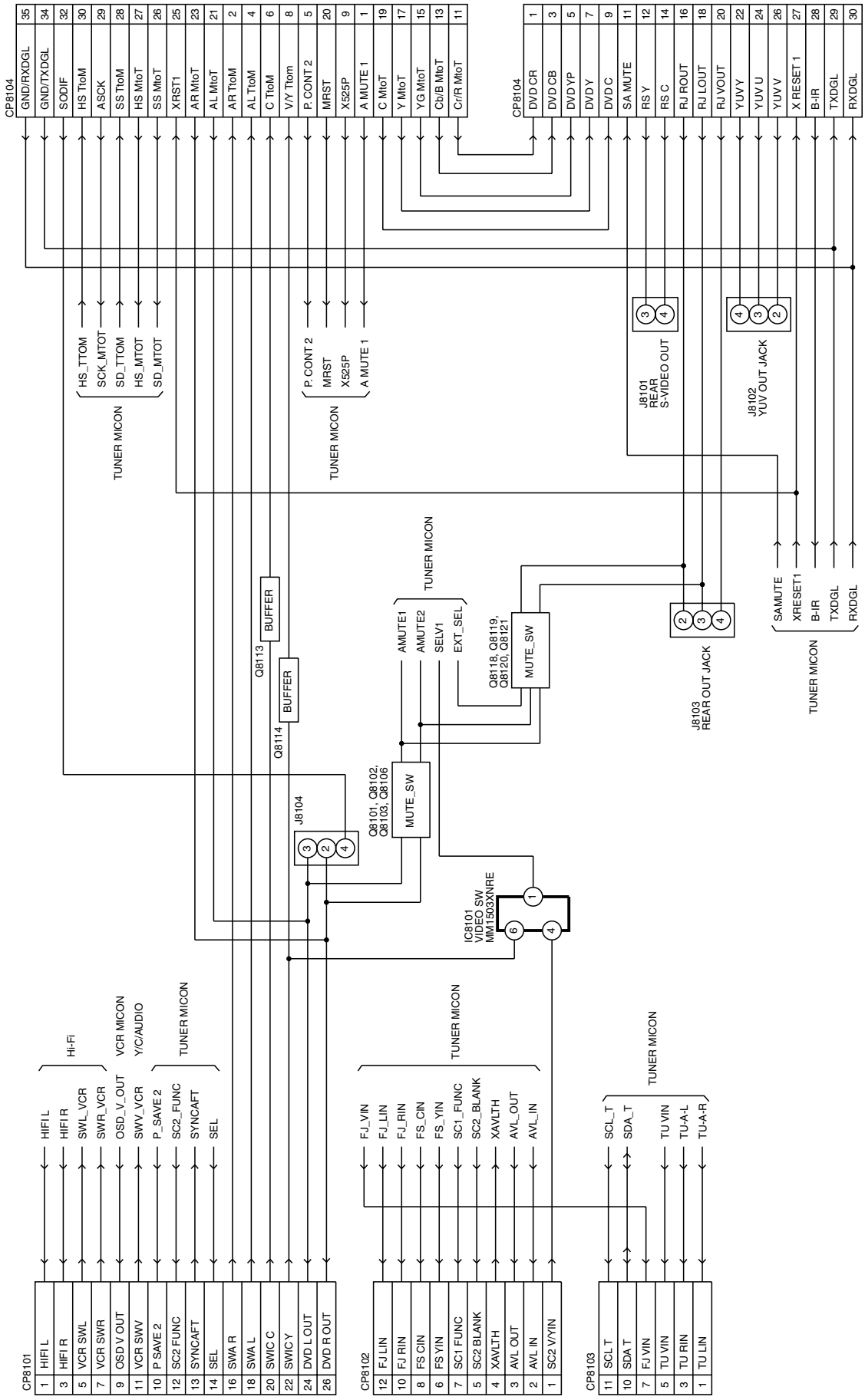
3.1.6 TUNER CONTROL BLOCK

TUNER MICON BLOCK DIAGRAM



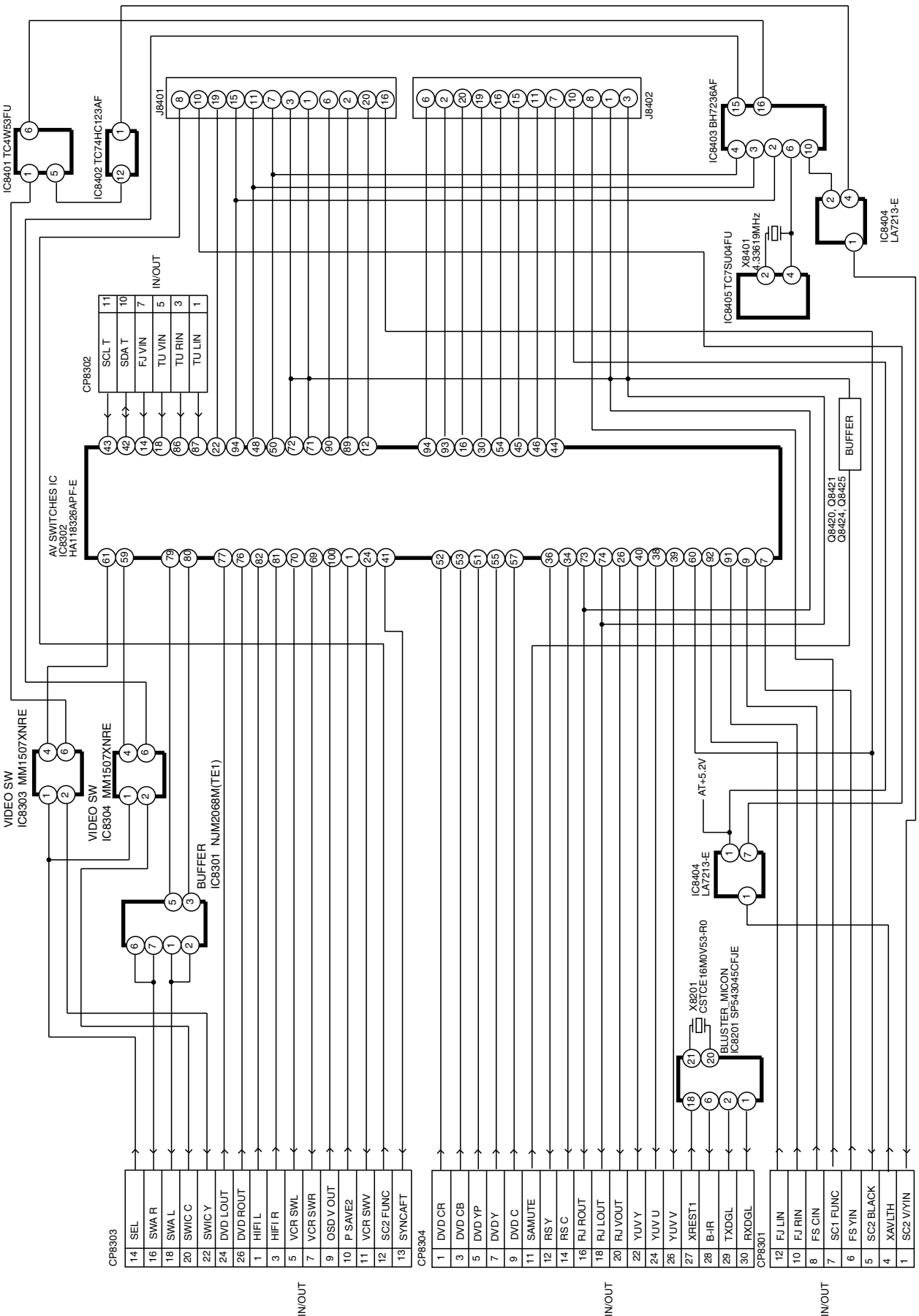
3.1.7 IN/OUT BLOCK

IN/OUT BLOCK DIAGRAM



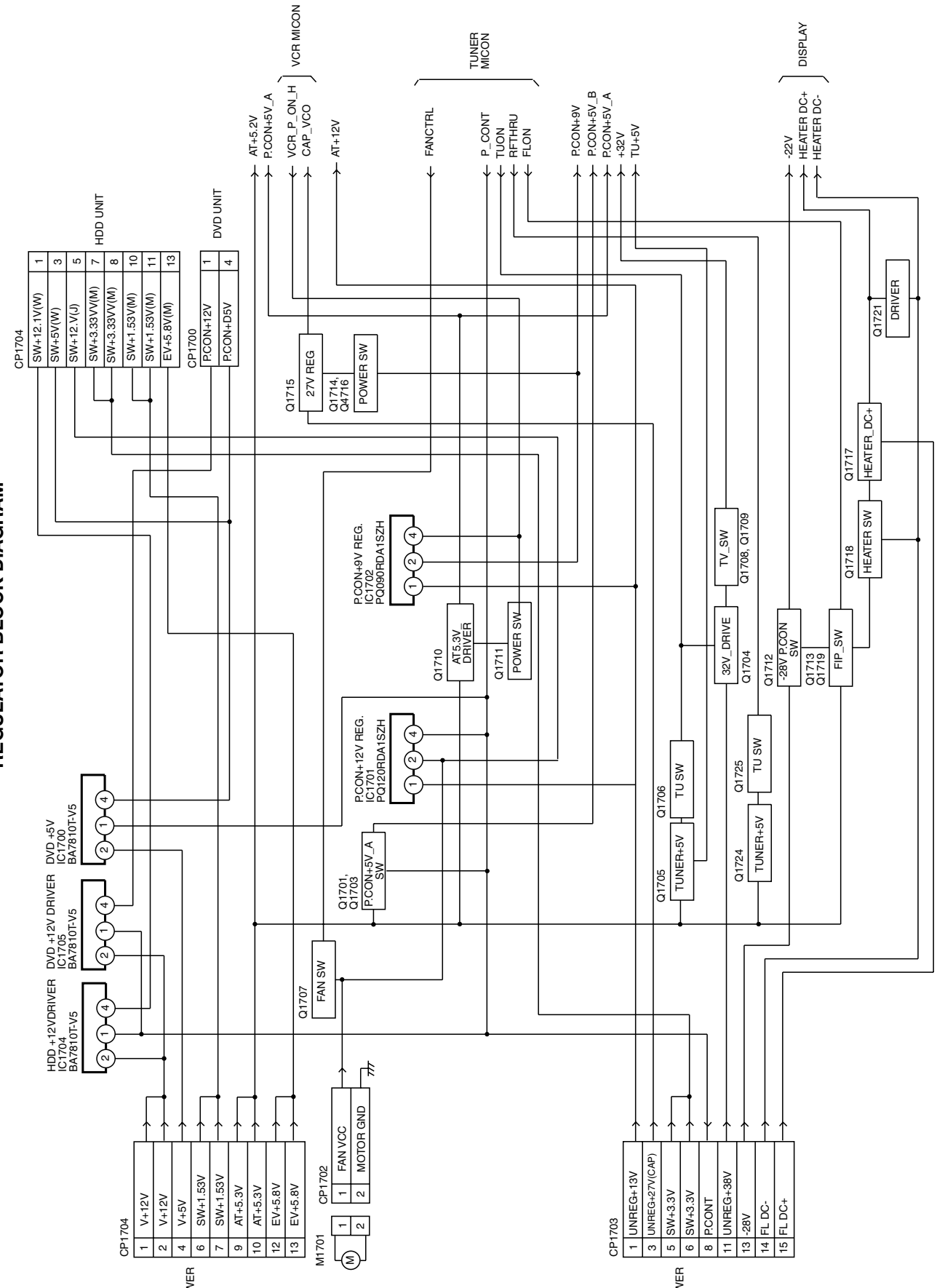
3.1.8 AV JACK/21PIN BLOCK

AV JACK/21PIN BLOCK DIAGRAM



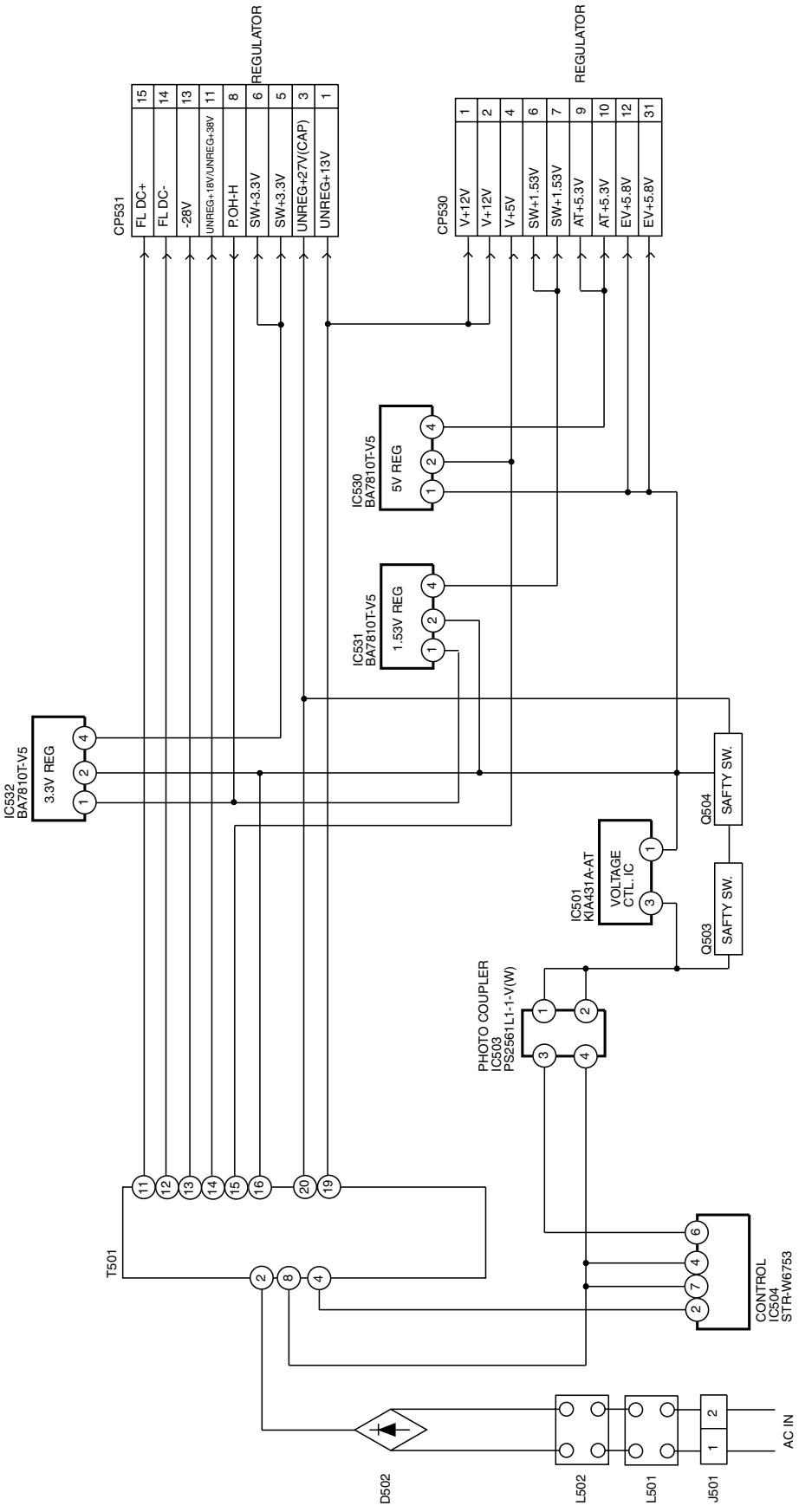
3.1.9 REGULATOR BLOCK

REGULATOR BLOCK DIAGRAM

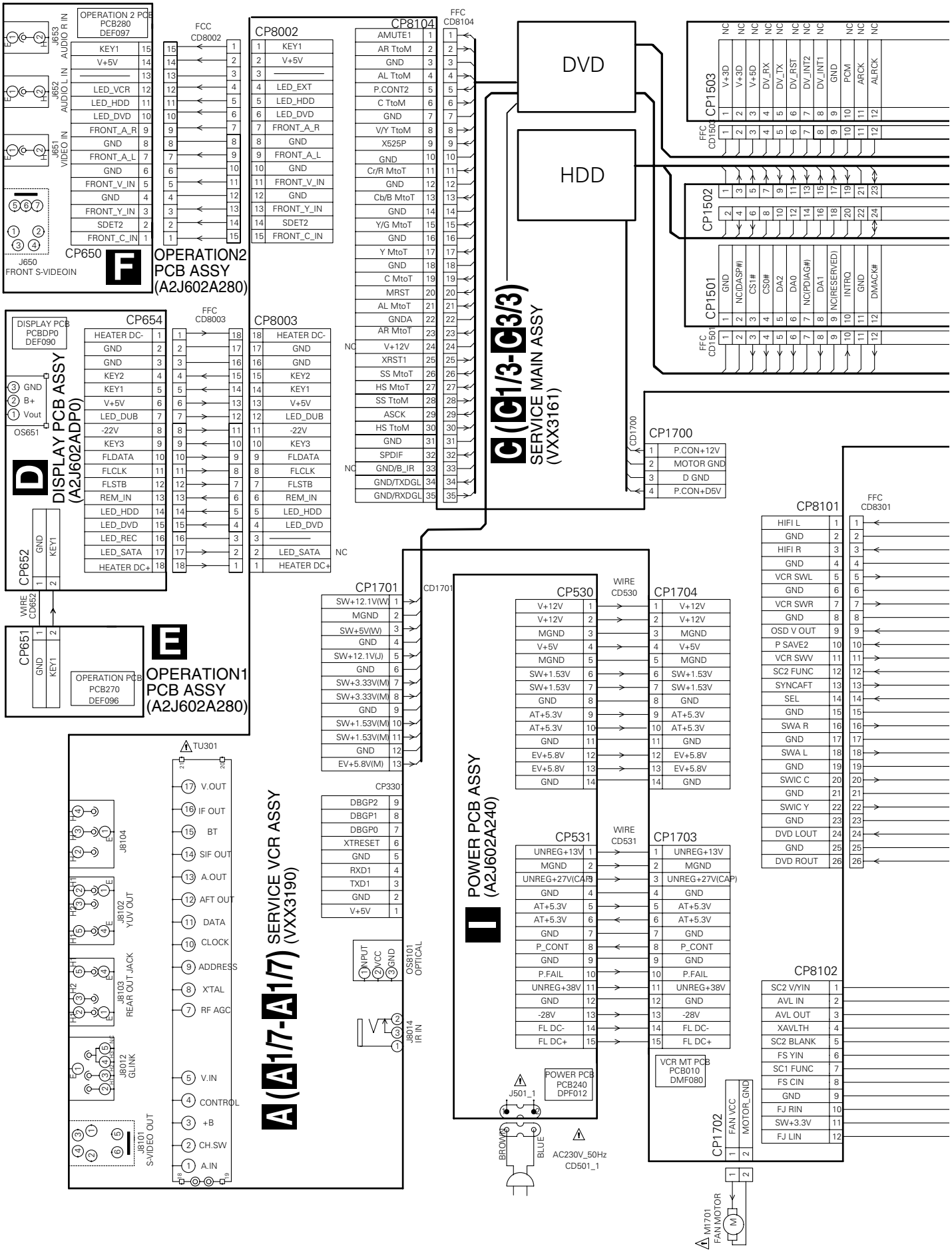


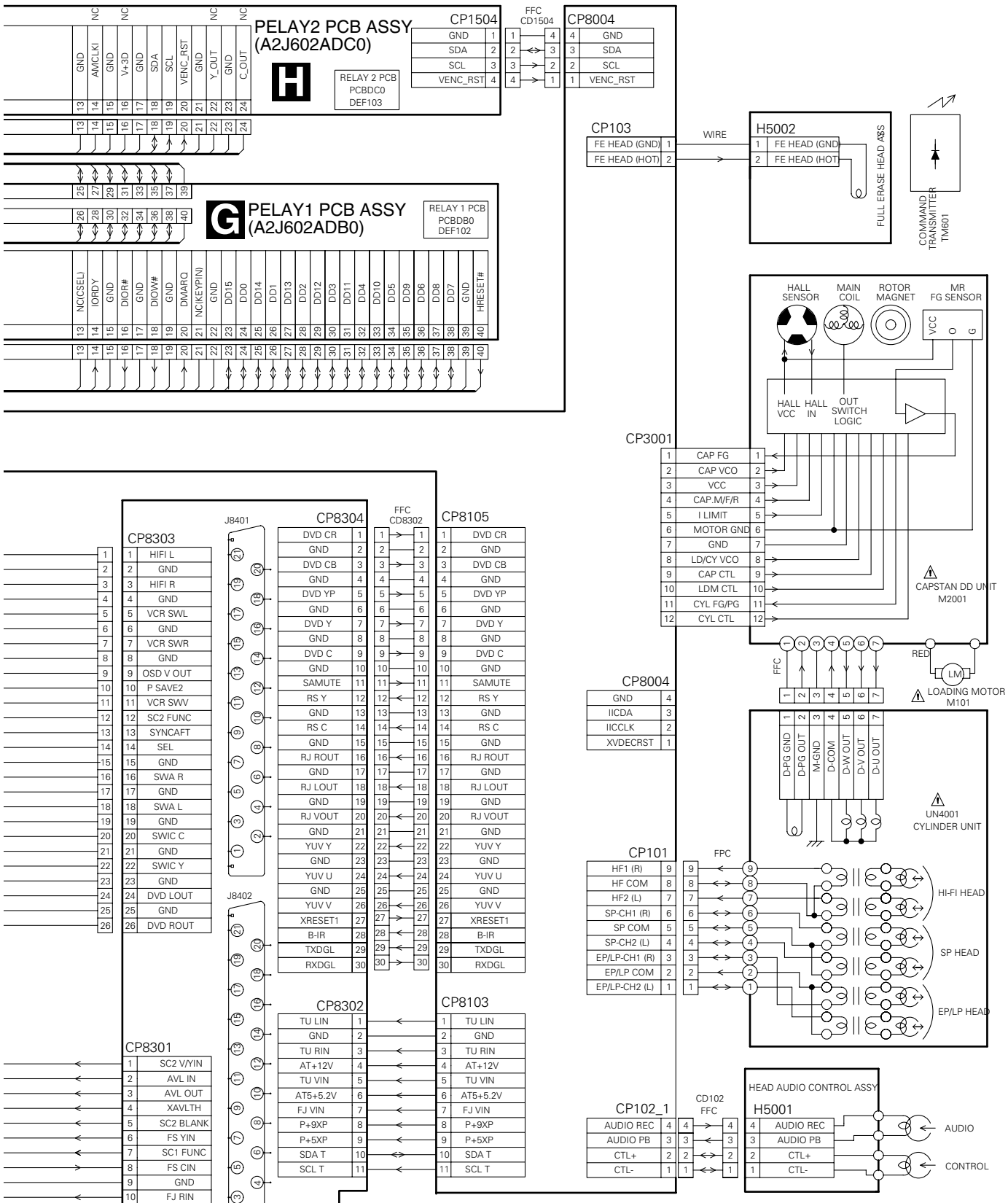
3.1.10 POWER BLOCK

POWER BLOCK DIAGRAM



3.2 OVERALL WIRING DIAGRAM





B (B1/3-B3/3)

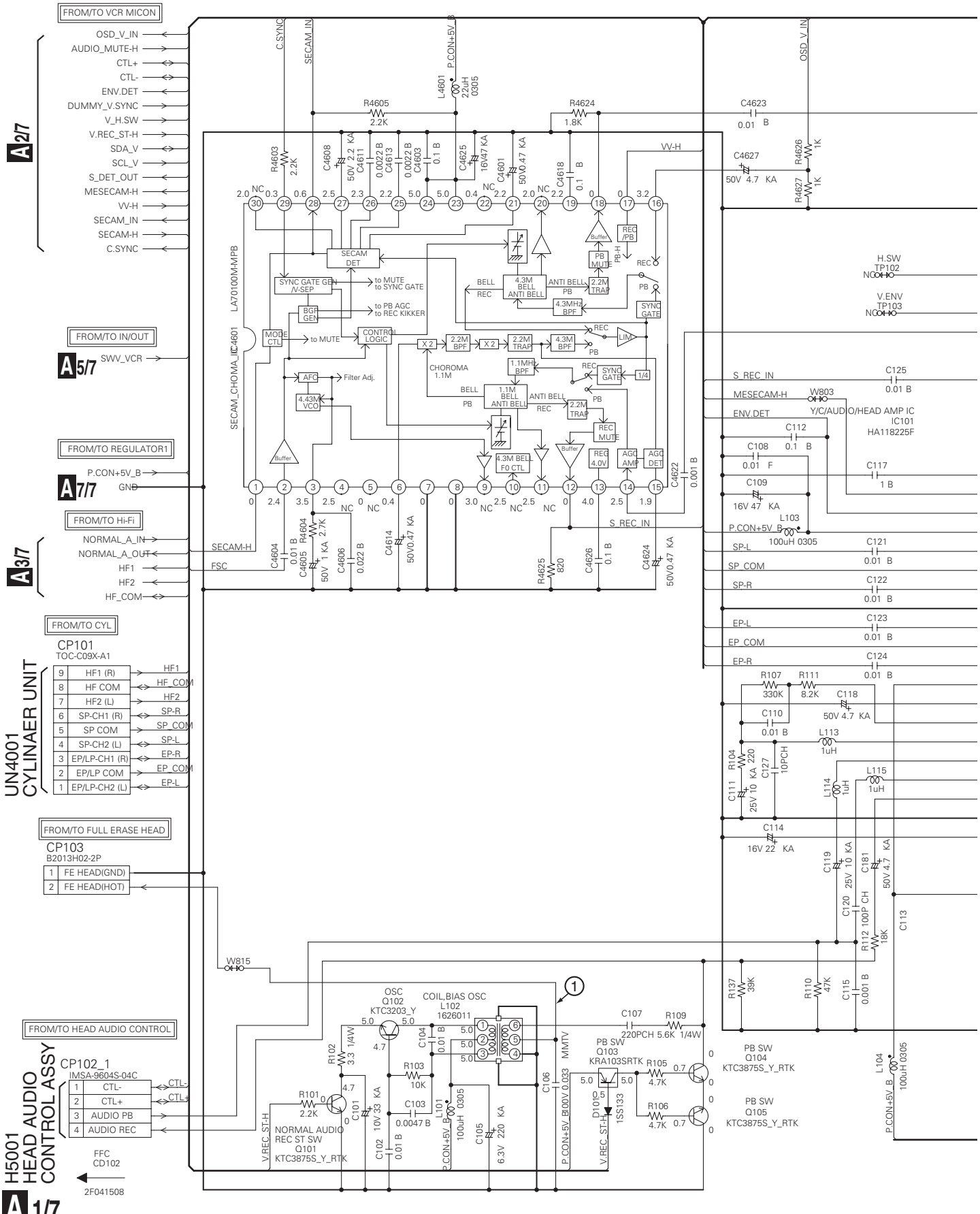
AV PCB ASSY
(A2J602AD20)

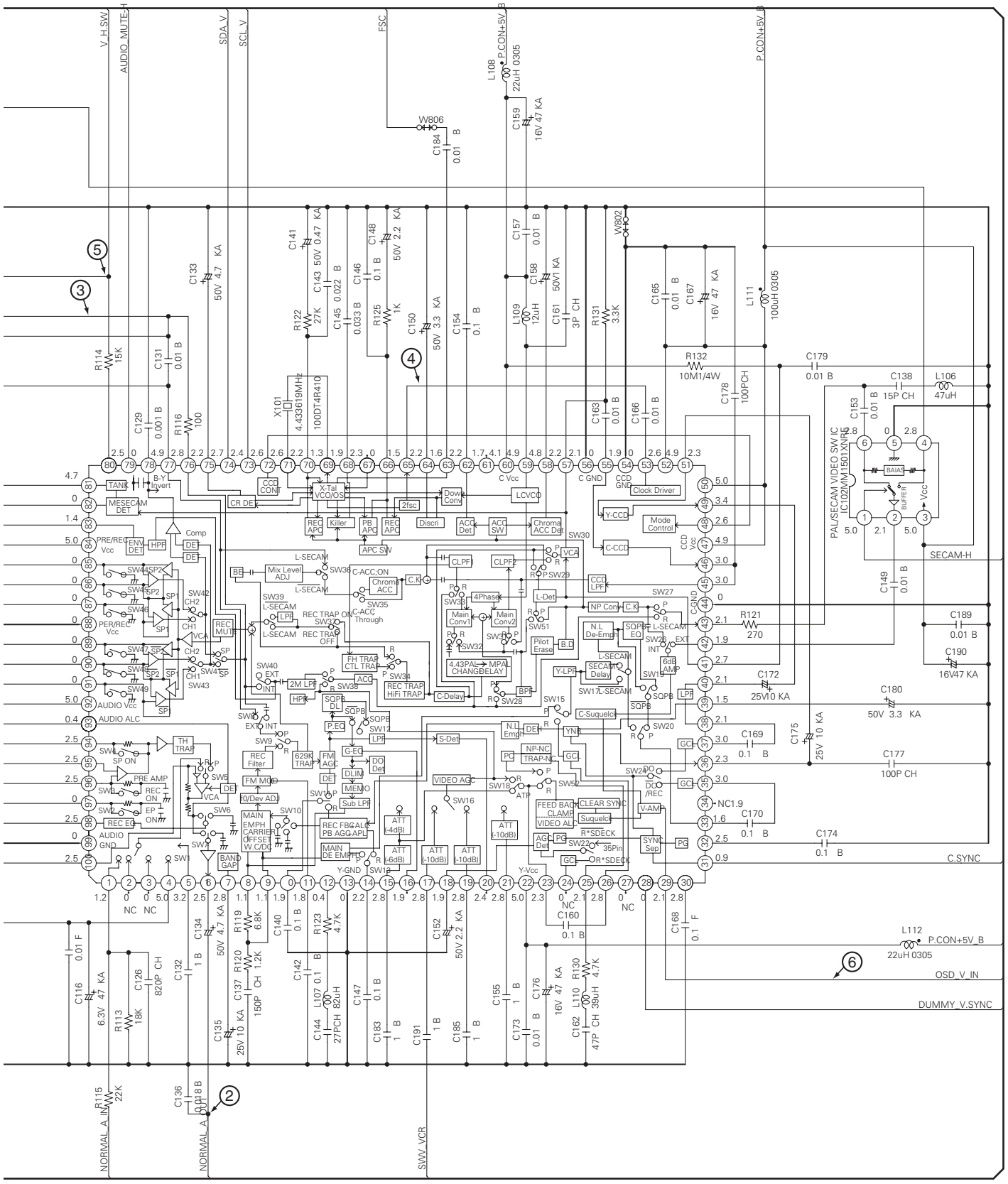
- When ordering service parts, be sure to refer to "EXPLODED VIEWS and PARTS LIST" or "PCB PARTS LIST".
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- : The power supply is shown with the marked box.

3.3 SERVICE VCR ASSY (1/7)

A 1/7 SERVICE VCR ASSY (VXX3190)

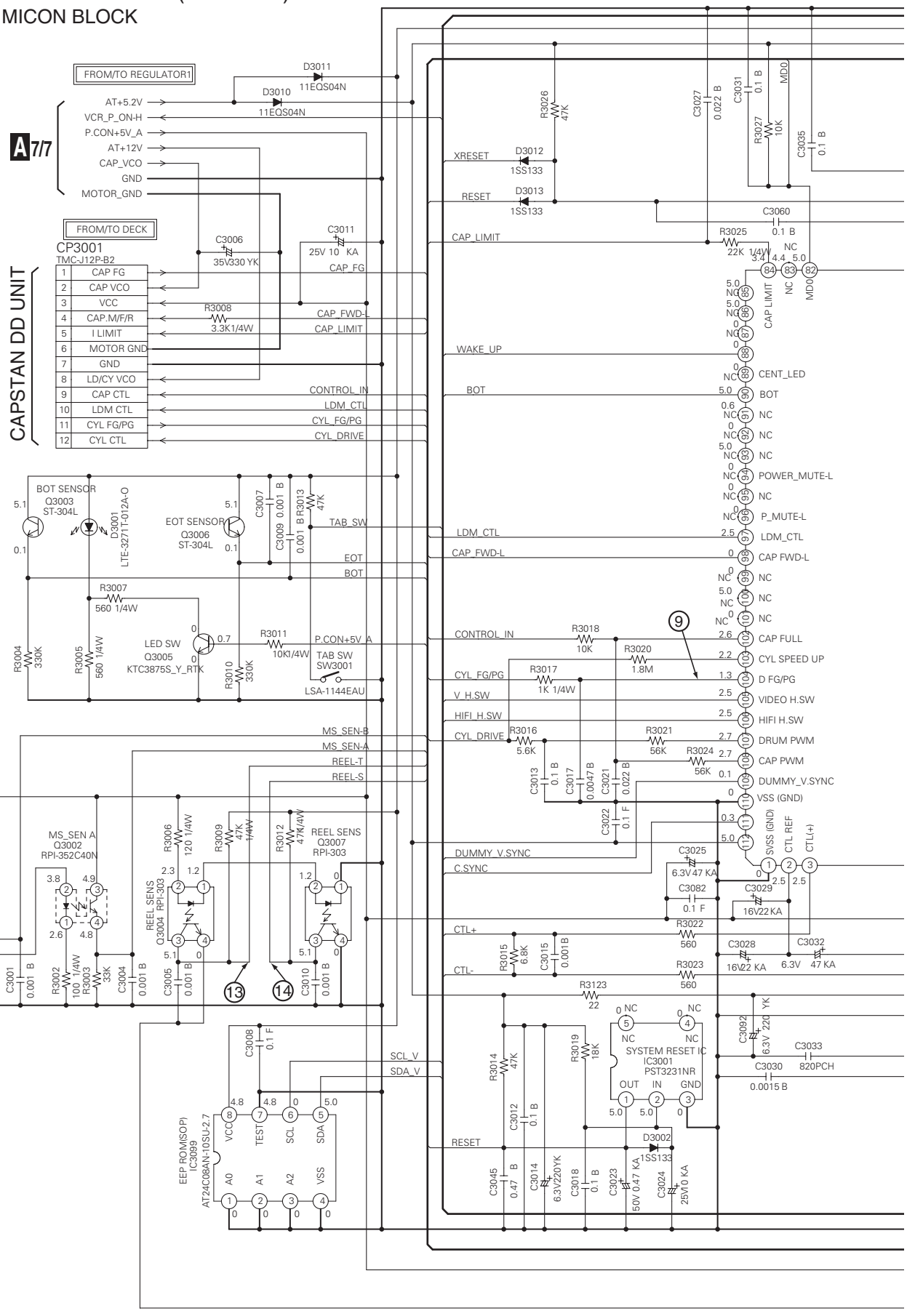
• Y/C AUDIO BLOCK

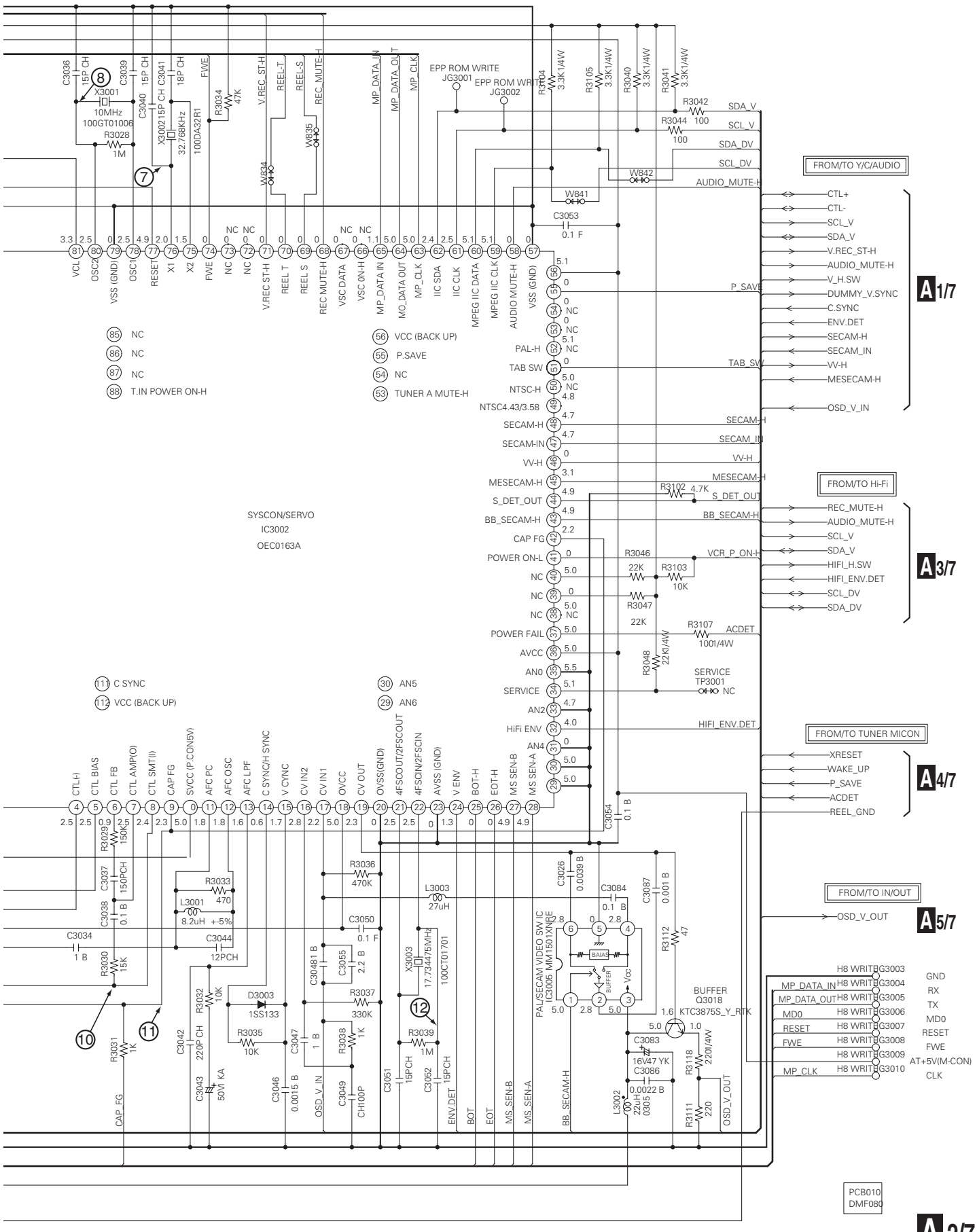



V_H.SW
AUDIO_MUTE
SDA_V
SCL_V
FSC
P.CON+5V_B
L108 22uH 0305
C159 16V 47 KA
W806
C184 0.01 B
W802
C141 50V 0.47 KA
C143 0.022 B
C145 0.033 B
C146 0.1 B
C148 50V 2.2 KA
C150 50V 3.3 KA
C154 0.1 B
C157 0.01 B
C158 50V1 KA
C161 3P CH
C163 0.01 B
C165 0.01 B
C166 0.01 B
C167 16V 47 KA
L111 100uH 0305
L109 12uH
L110 39uH
L112 22uH 0305
C133 50V 4.7 KA
C131 0.01 B
C129 0.001 B
C116 0.01 F
C126 820P CH
C132 1 B
C134 50V 4.7 KA
C135 25V 10 KA
C136 0.01 B
C137 150P CH
C140 0.1 B
C142 0.1 B
C144 27PCH
C147 0.1 B
C152 50V 2.2 KA
C155 1 B
C162 47P CH
C168 0.1 F
C169 0.1 B
C170 0.1 B
C172 25V10 KA
C174 0.1 B
C175 25V 10 KA
C176 16V 47 KA
C177 100P CH
C178 100PCH
C179 0.01 B
C180 50V 3.3 KA
C183 1 B
C185 1 B
C189 0.01 B
C190 16V47 KA
C191 1 B
R114 15K
R116 100
R113 18K
R115 22K
R119 6.8K
R120 1.2K
R122 27K
R123 4.7K
R125 1K
R130 4.7K
R131 3.3K
R132 10M1/4W
X101 4.433619MHz 100DT4R410
NORMAL_A_IN
NORMAL_A_OUT
SW_VCR
Y-GND
Y-Vcc
C Vcc
C GND
CCD GND
CCD Vcc
C-GND
Clock Driver
Mode Control
Y-CCD
C-CCD
PAL/SECAM VIDEO SW IC
IC102MM1501XNR5
BIAS
BUFFER
Vcc
SECAM-H
C.SYNC
OSD_V_IN
DUMMY_V.SYNC
P.CON+5V_B
TANK
B-Y Invert
ME/SECAM DET
CR DET
CCD CONT
X-Tal VCO/OSC
Down Conv
LCVCO
2fsc
REC APC
Killer
PB APC
Discri
ACC Det
ACC SW
Chroma ACC Det
APC SW
PRE/REC Vcc
ENV DET
HPF
Comp
DET
L-SECAM
BE
Mix Level ADJ
C-ACC:ON
Chroma ACC
C.K
CLPF1
CLPF2
VCA
CCD LPF
NP Conv
REC MUTE
REC TRAP ON
REC TRAP OFF
C-ACC Through
4Phase
Main Conv1
Main Conv2
L-Det
Pilot Erase
B.D
N.L De-Emph
SOPB EQ
INT
EXT
6dB AMP
FH TRAP CTL TRAP
4.43PAL→MPAL CHANGE DELAY
Y-LPF
SECAM Delay
2M LPF
HPF
SOPB DL
REC TRAP HiFi TRAP
C-Delay
BPF
C-Suquelch
N.L Emph
YNR
P.EQ
S-Det
NP-NC
TRAP-NC
TH TRAP
SW1 SP ON
PRE AMP
REC ON
EP ON
REC EQ
AUDIO GND
AUDIO Vcc
AUDIO ALC
REC Filter
629K TRAP
FM AGC
G-EQ
DLIM
MEMO
Sub LPF
DO /Det
DO /REC
FM MOD
f0/Dev ADJ
MAIN EMPH CARRIER OFFSET W.C/DC
REC FB&ALC PB AGC&APC
MAIN DE EMPH
VIDEO AGC
ATT (-4dB)
ATT (-6dB)
ATT (-10dB)
FEED BACK CLAMP
VIDEO ALC
CLEAR SYNC
Suquelch
R*SDECK
V-AMP
AGC Det
SYNC Sep
35Pin
R*SDECK
BAND GAP
NC
NC1.9
SECAM-H
C.SYNC
CAUTION: DIGITAL TRANSISTOR
CAUTION: DIGITAL TRANSISTOR
PCB010
DMF080
A 1/7
DVR-RT602H-S
35

A 2/7 SERVICE VCR ASSY (VXX3190)

• VCR MICON BLOCK

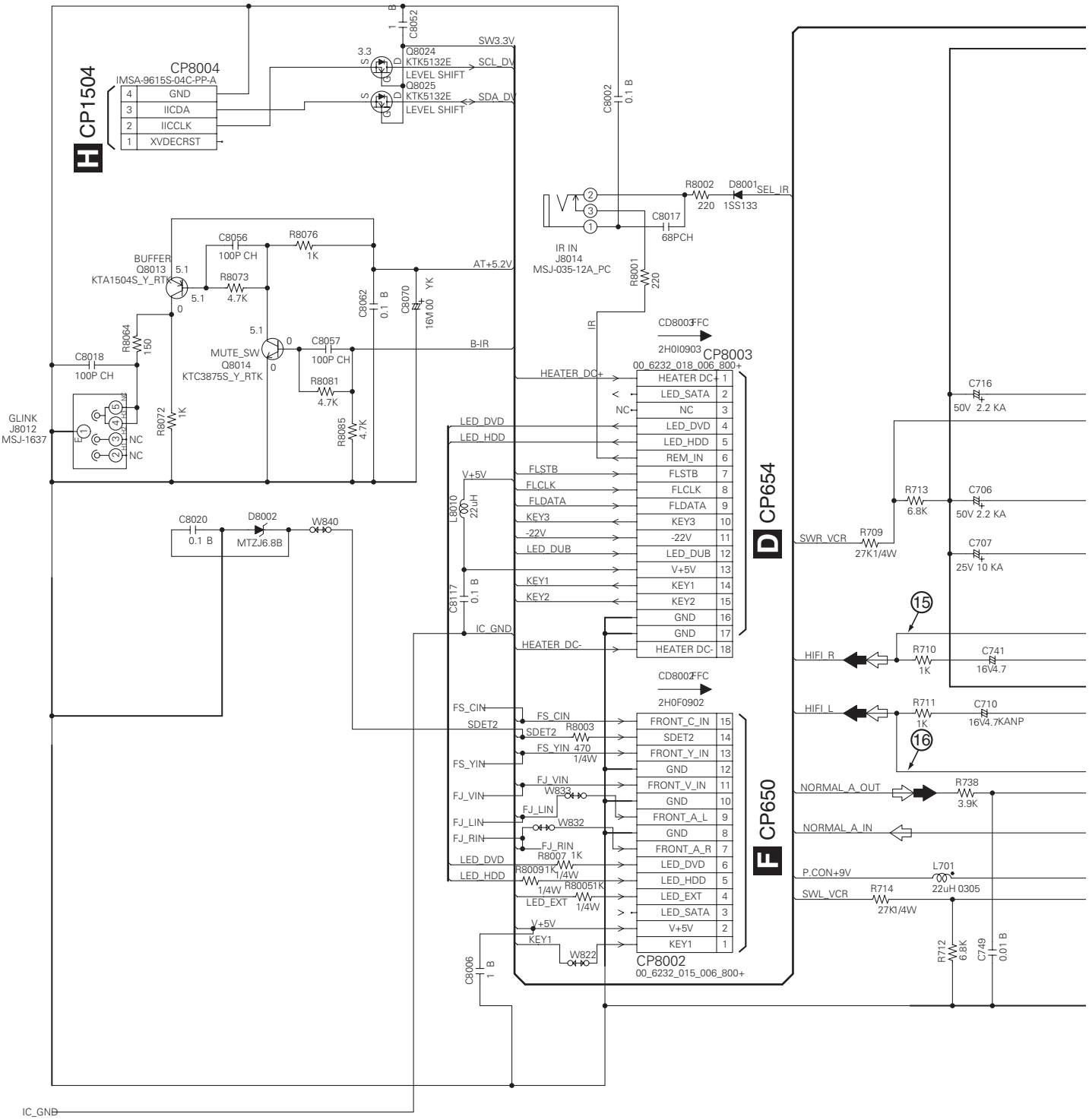


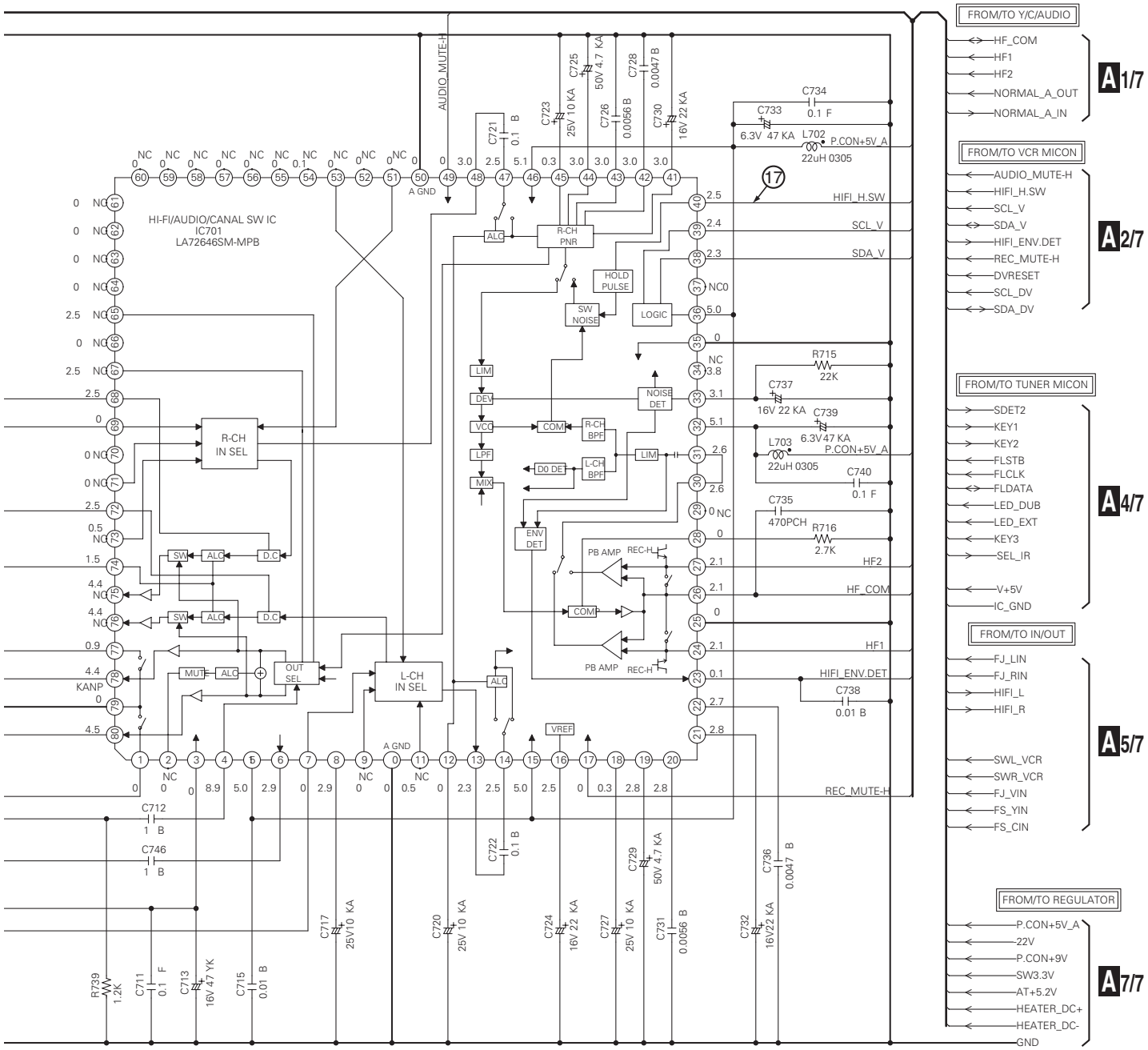

SYSCON/SERVO
IC3002
OEC0163A
EPP ROM WRITE
JG3001
JG3002
FROM/TO Y/C/AUDIO
FROM/TO Hi-Fi
FROM/TO TUNER MICON
FROM/TO IN/OUT
SDA_V
SCL_V
SDA_DV
SCL_DV
AUDIO_MUTE-H
P_SAVE
TAB_SW
SECAM-H
SECAM_IN
VV-H
MESECAM-H
S_DET_OUT
BB_SECAM-H
VCR_P_ON-H
HIFI_ENV.DET
ACDET
OSD_V_IN
OSD_V_OUT
XRESET
WAKE_UP
REEL_GND
SERVICE
TP3001
BUFFER
Q3018
KTC3875S_Y_RTK
PAL/SECAM VIDEO SW IC
IC3005 MM1501XNRE
PCB010
DMF080
A1/7
A2/7
A3/7
A4/7
A5/7

3.5 SERVICE VCR ASSY(3/7)

A 3/7 SERVICE VCR ASSY (VXX3190)

• Hi-Fi BLOCK

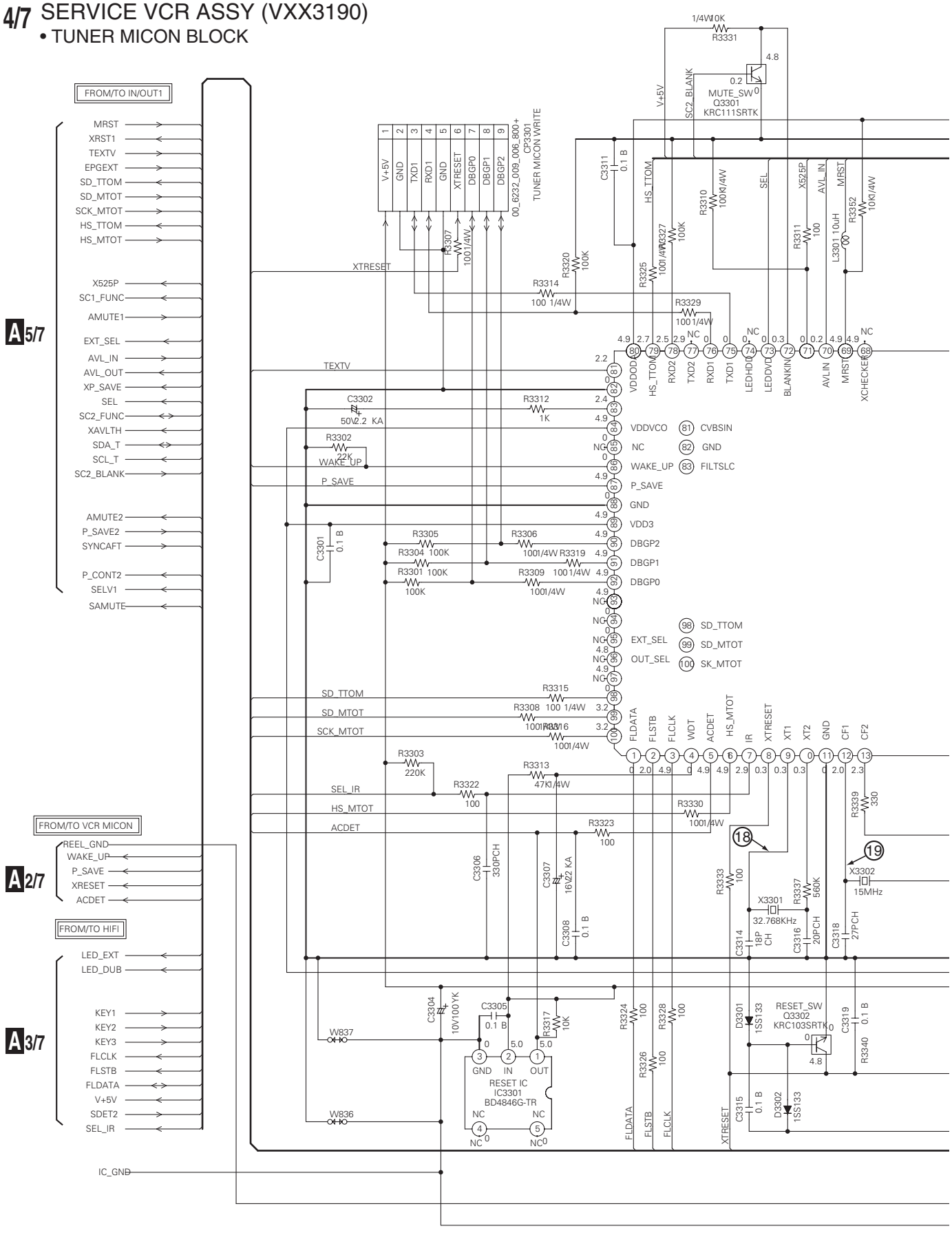


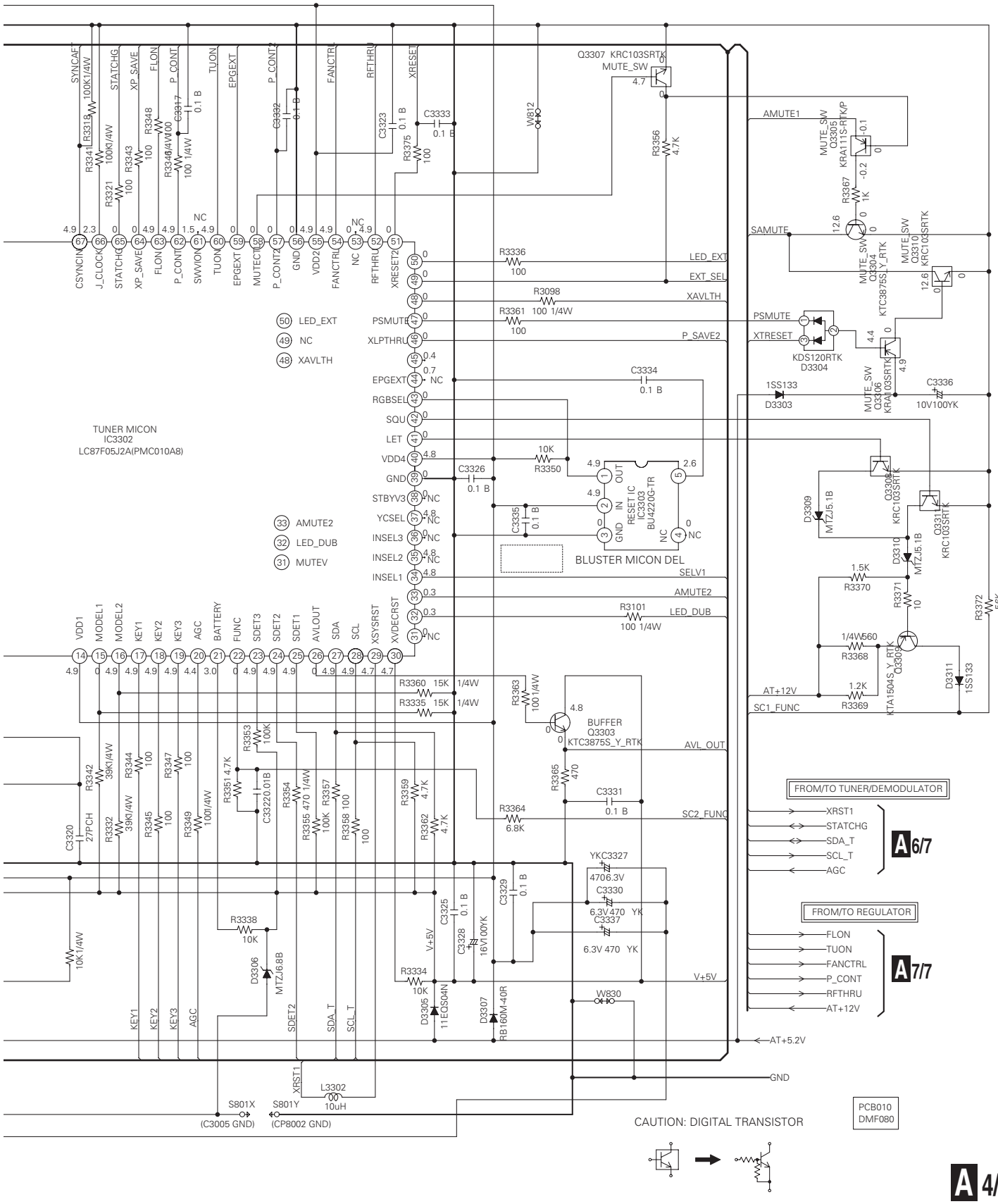

HI-FI/AUDIO/CANAL SW IC
IC701
LA72646SM-MPB
FROM/TO Y/C/AUDIO
HF_COM
HF1
HF2
NORMAL_A_OUT
NORMAL_A_IN
A1/7
FROM/TO VCR MICON
AUDIO_MUTE-H
HIFI_H.SW
SCL_V
SDA_V
HIFI_ENV.DET
REC_MUTE-H
DVRESET
SCL_DV
SDA_DV
A2/7
FROM/TO TUNER MICON
SDET2
KEY1
KEY2
FLSTB
FLCLK
FLDATA
LED_DUB
LED_EXT
KEY3
SEL_IR
V+5V
IC_GND
A4/7
FROM/TO IN/OUT
FJ_LIN
FJ_RIN
HIFI_L
HIFI_R
SWL_VCR
SWR_VCR
FJ_VIN
FS_YIN
FS_CIN
A5/7
FROM/TO REGULATOR
P.CON+5V_A
22V
P.CON+9V
SW3.3V
AT+5.2V
HEATER_DC+
HEATER_DC-
GND
A7/7
AUDIO_MUTE-H
HIFI_H.SW
SCL_V
SDA_V
SDA_V
HF2
HF_COM
HF1
HIFI_ENV.DET
REC_MUTE-H
P.CON+5V_A
R-CH IN SEL
L-CH IN SEL
R-CH PNR
L-CH BPF
R-CH BPF
SW NOISE
HOLD PULSE
LOGIC
NOISE DET
ENV DET
PB AMP
OUT SEL
A GND
VREF
C712 1 B
C746 1 B
C721 0.1 B
C722 0.1 B
C723 25V 10 KA
C725 50V 4.7 KA
C726 0.0056 B
C728 0.0047 B
C729 50V 4.7 KA
C730 16V 22 KA
C731 0.0056 B
C732 16V22 KA
C733 6.3V 47 KA
C734 0.1 F
C735 470PCH
C736 0.0047 B
C737 16V 22 KA
C738 0.01 B
C739 6.3V 47 KA
C740 0.1 F
L702 22uH 0305
L703 22uH 0305
R715 22K
R716 2.7K
R739 1.2K
C711 0.1 F
C713 16V 47 YK
C715 0.01 B
C717 25V10 KA
C720 25V 10 KA
C724 16V 22 KA
C727 25V 10 KA
PCB010
DMF080
CAUTION: DIGITAL TRANSISTOR
CAUTION: DIGITAL TRANSISTOR

3.6 SERVICE VCR ASSY(4/7)

A 4/7 SERVICE VCR ASSY (VXX3190)

• TUNER MICON BLOCK

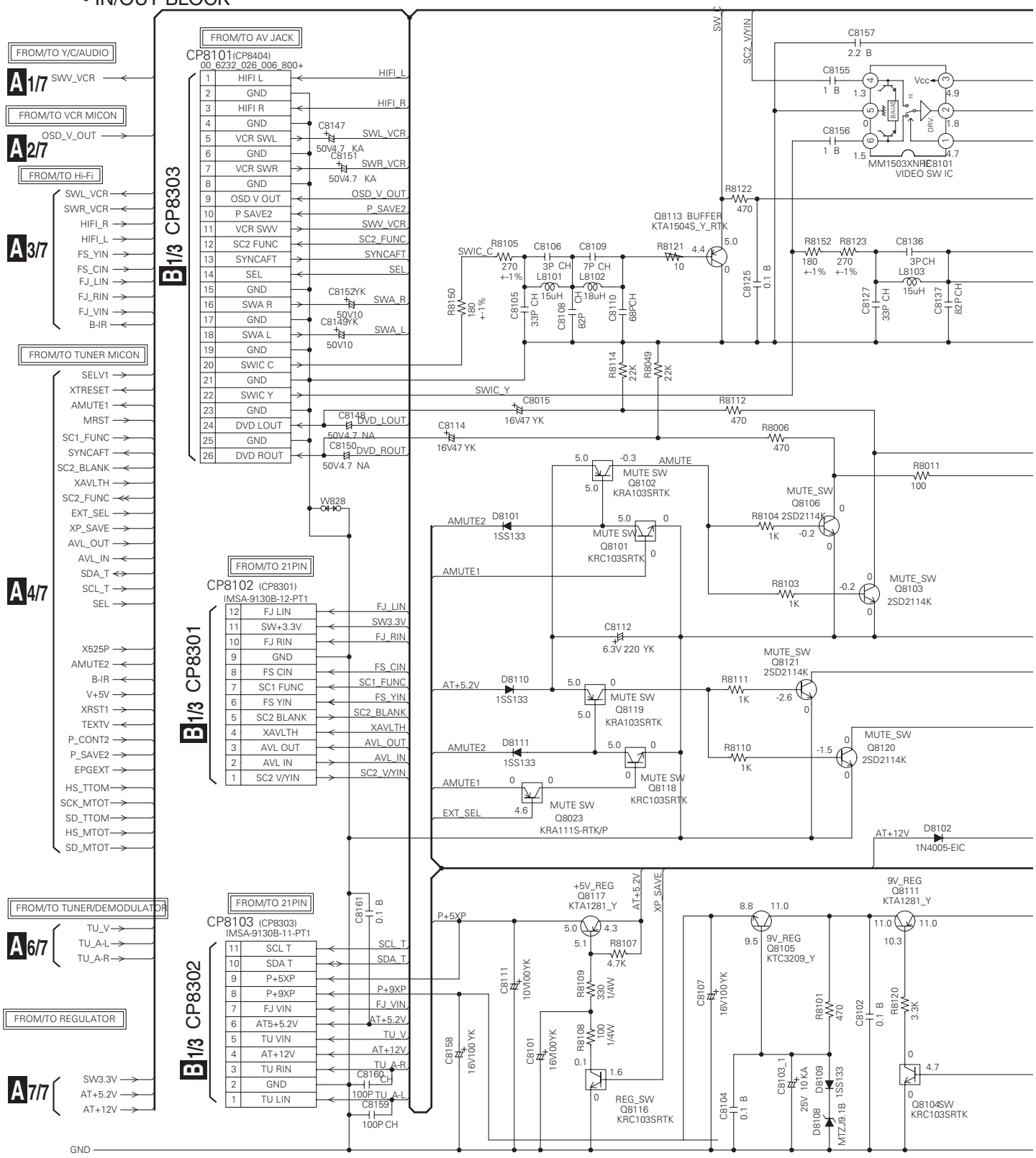



TUNER MICON
IC3302
LC87F05J2A(PMC010A8)
BLUSTER MICON DEL
RESET IC
IC3303
BU4220G-TR
BUFFER
Q3303
KTC3875S_Y_RTK
Q3307 KRC103SRTK
MUTE_SW
AMUTE1
SAMUTE
PSMUTE
XTRESET
KDS120RTK
D3304
1SS133
D3303
10V100YK
LED_EXT
EXT_SEL
XAVLTH
P_SAVE2
AMUTE2
LED_DUB
SELV1
AVL_OUT
SC2_FUNC
AT+12V
SC1_FUNC
V+5V
AT+5.2V
GND
W812
W830
FROM/TO TUNER/DEMODULATOR
XRST1
STATCHG
SDA_T
SCL_T
AGC
A6/7
FROM/TO REGULATOR
FLON
TUON
FANCTRL
P_CONT
RFTHRU
AT+12V
A7/7
CAUTION: DIGITAL TRANSISTOR
PCB010
DMF080
S801X
S801Y
(C3005 GND)
(CP8002 GND)
L3302
10uH
A4/7

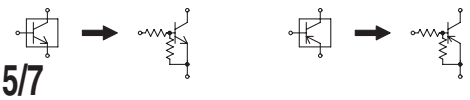
3.7 SERVICE VCR ASSY(5/7)

A 5/7 SERVICE VCR ASSY (VXX3190)

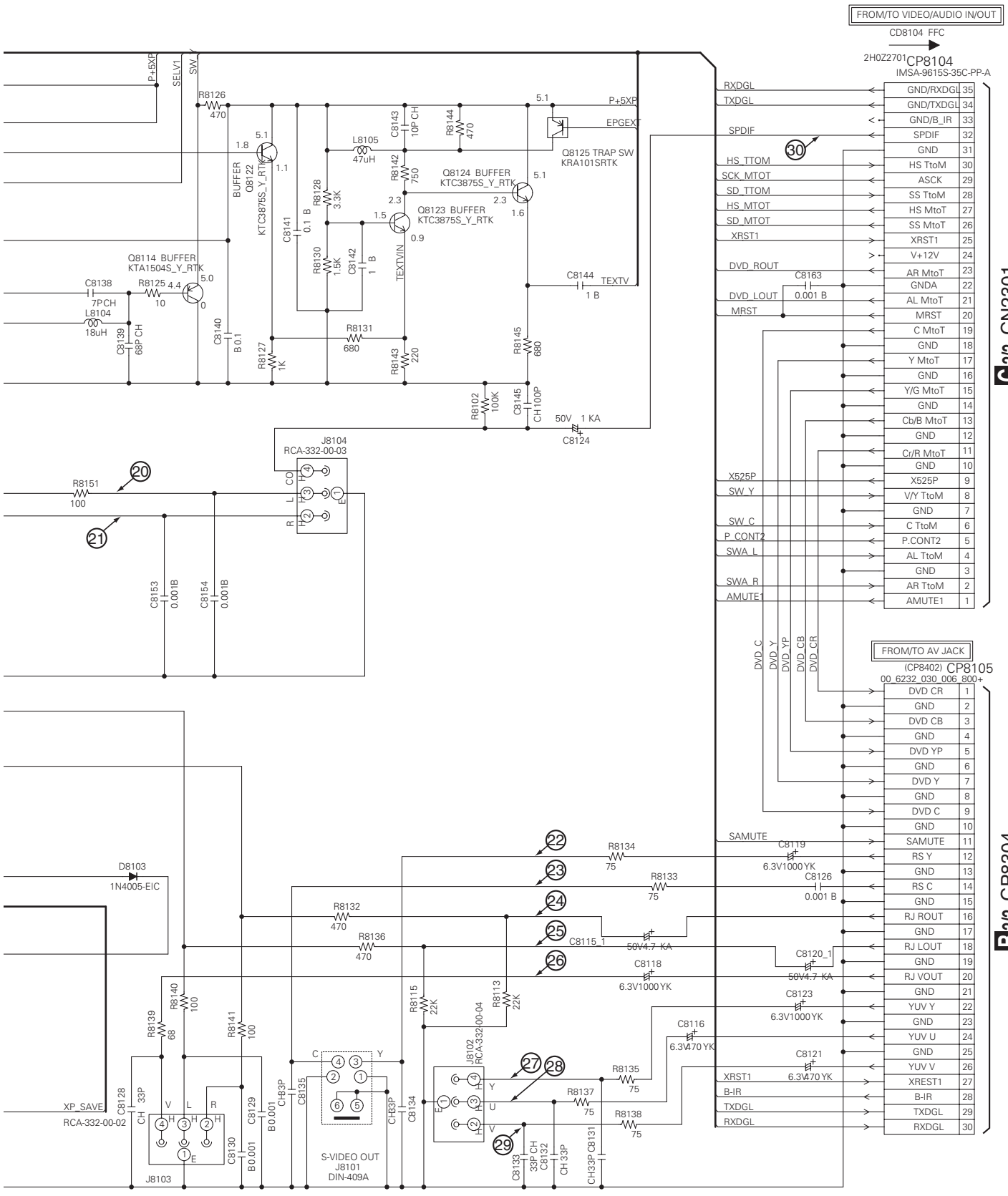
• IN/OUT BLOCK



CAUTION: DIGITAL TRANSISTOR CAUTION: DIGITAL TRANSISTOR



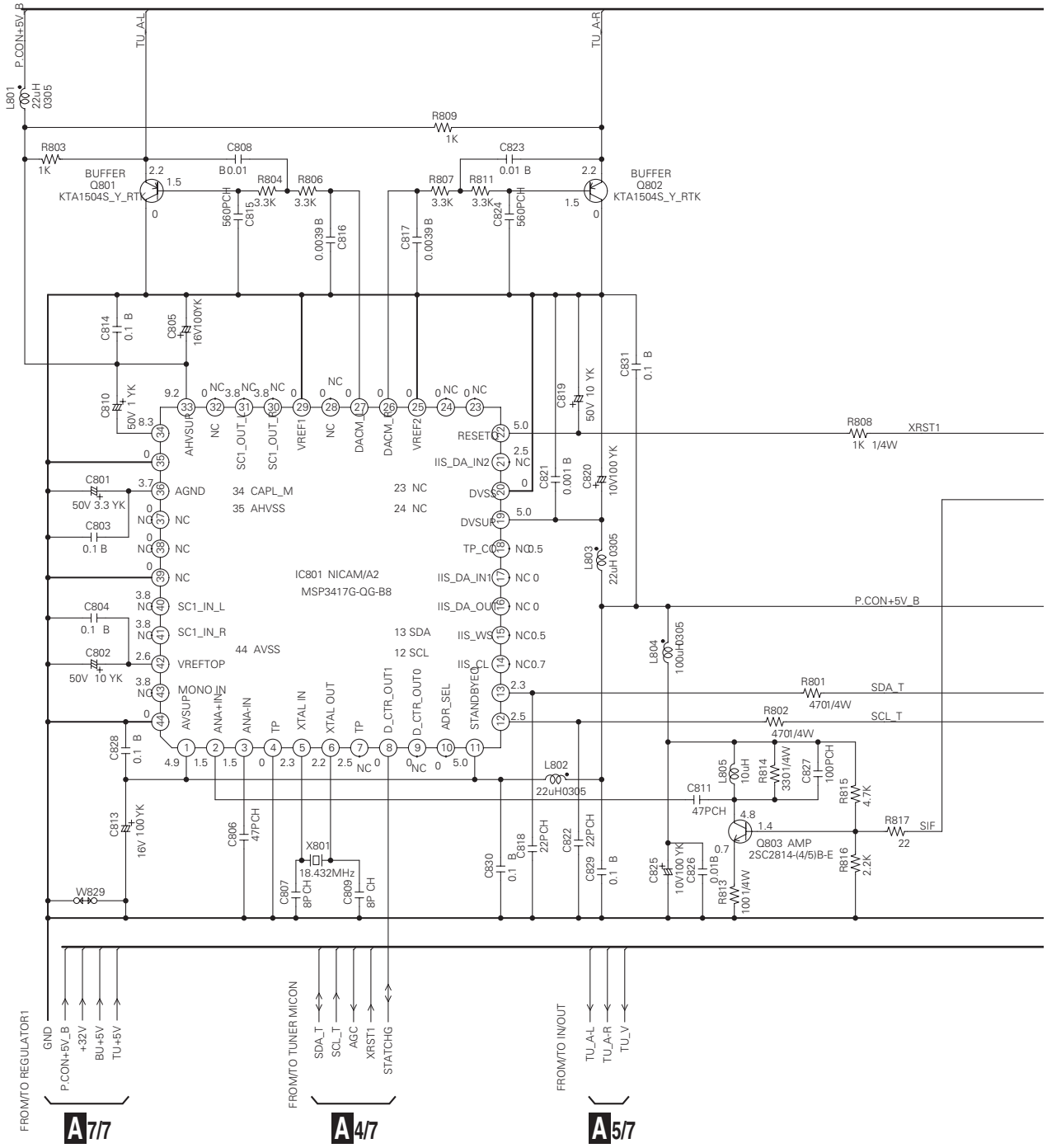
A 5/7

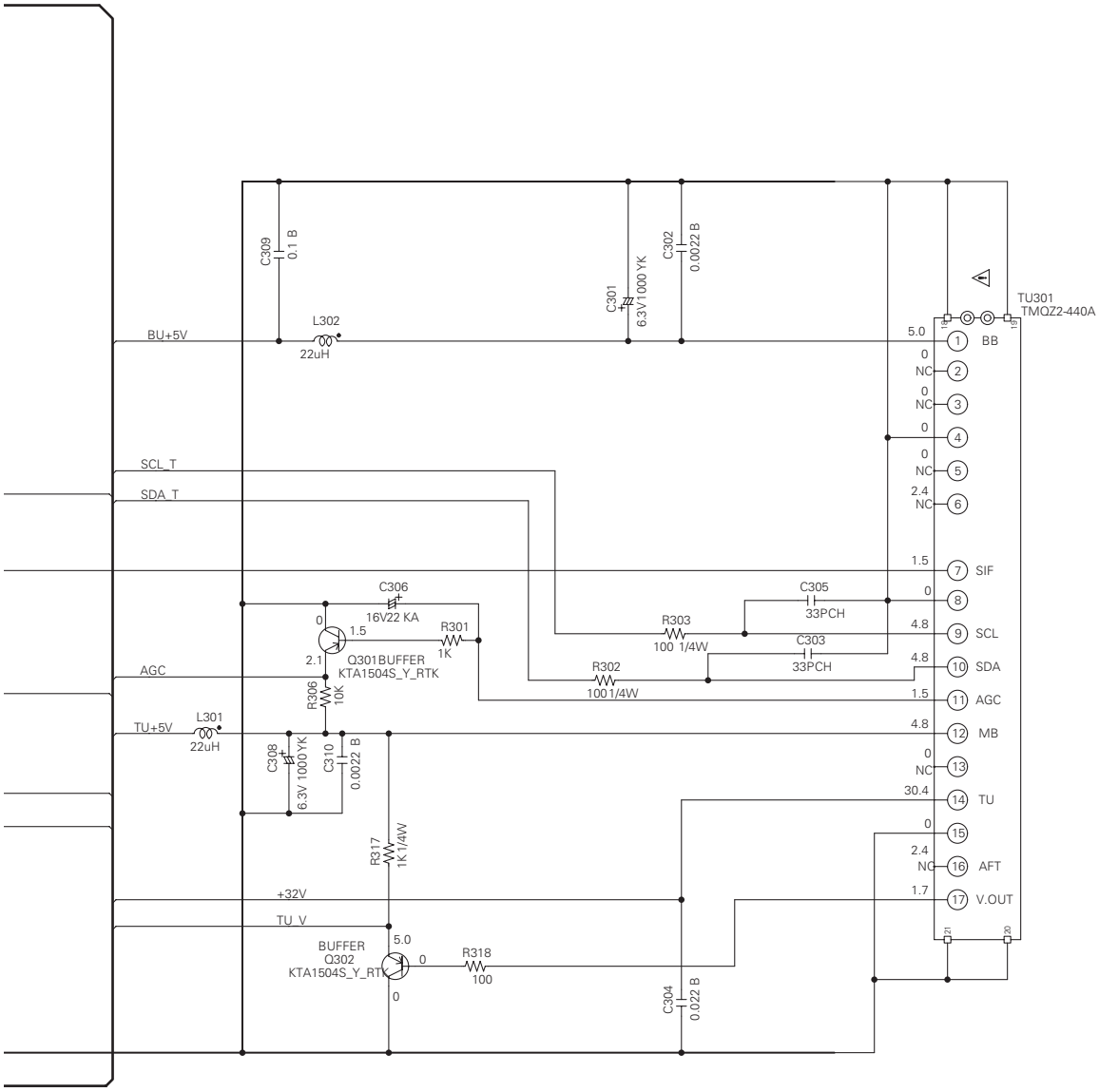

FROM/TO VIDEO/AUDIO IN/OUT
CD8104 FFC
2H0Z2701 CP8104
IMSA-9615S-35C-PP-A
C3/3 CN2301
FROM/TO AV JACK
(CP8402) CP8105
00_6232_030_006_800+
B3/3 CP8304
RXDGL
TXDGL
SPDIF
HS_TTOM
SCK_MTOT
SD_TTOM
HS_MTOT
SD_MTOT
XRST1
DVD_ROUT
DVD_LOUT
MRST
X525P
SW_Y
SW_C
P_CONT2
SWA_L
SWA_R
AMUTE1
DVD_C
DVD_Y
DVD_YP
DVD_CB
DVD_CR
SAMUTE
XRST1
B-IR
TXDGL
RXDGL
P+5XP
EPGEXT
Q8125 TRAP SW
KRA101SRTK
Q8124 BUFFER
KTC3875S_Y_RTK
Q8123 BUFFER
KTC3875S_Y_RTK
Q8114 BUFFER
KTA1504S_Y_RTK
BUFFER Q8122 KTC3875S_Y_RTK
TEXTVIN
TEXTV
J8104
RCA-332-00-03
J8103
XP_SAVE
RCA-332-00-02
J8102
RCA-332-00-04
S-VIDEO OUT
J8101
DIN-409A
D8103
1N4005-EIC

3.8 SERVICE VCR ASSY(6/7)

A 6/7 SERVICE VCR ASSY (VXX3190)

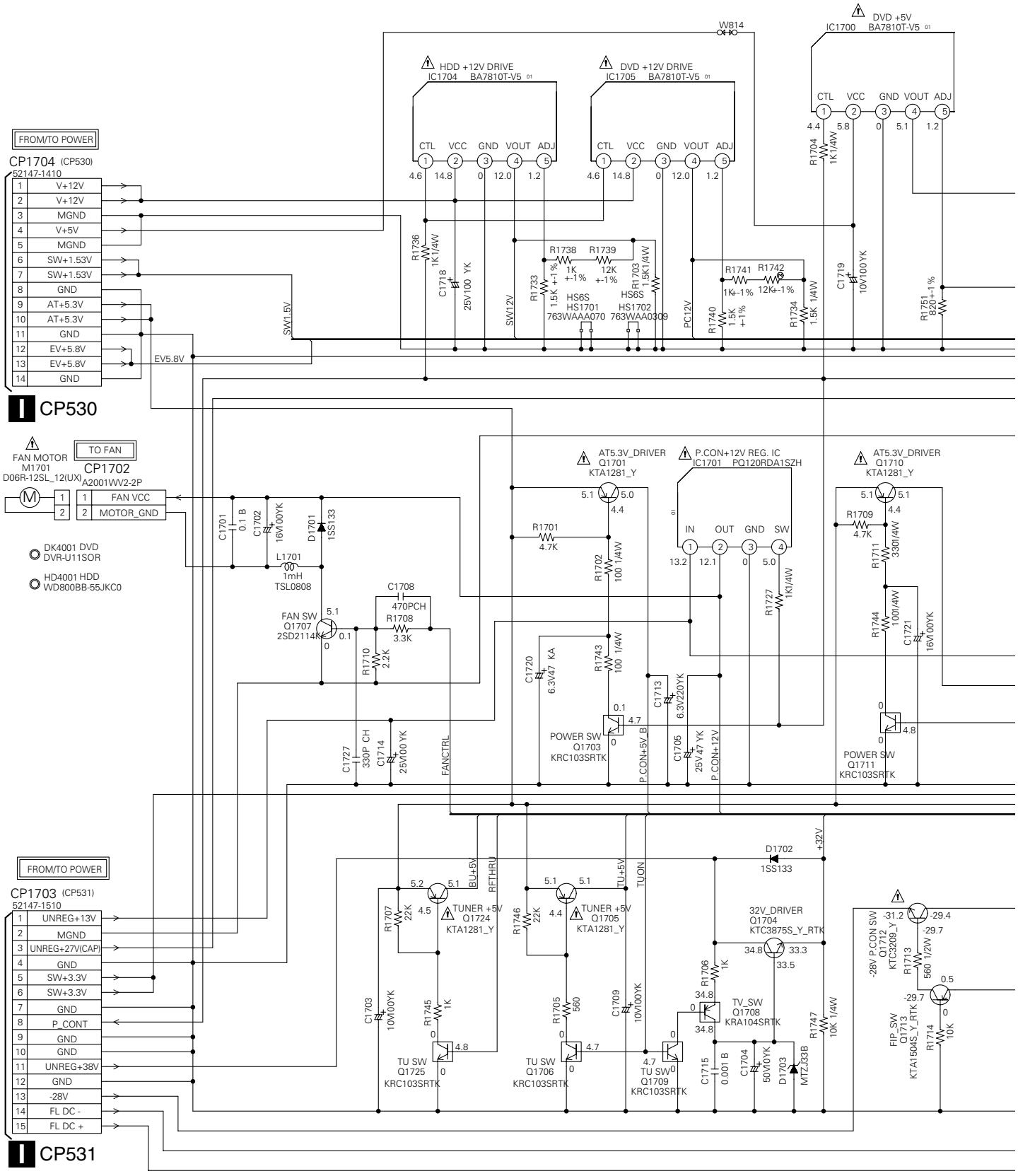
• TUNER/DEMODULATOR BLOCK



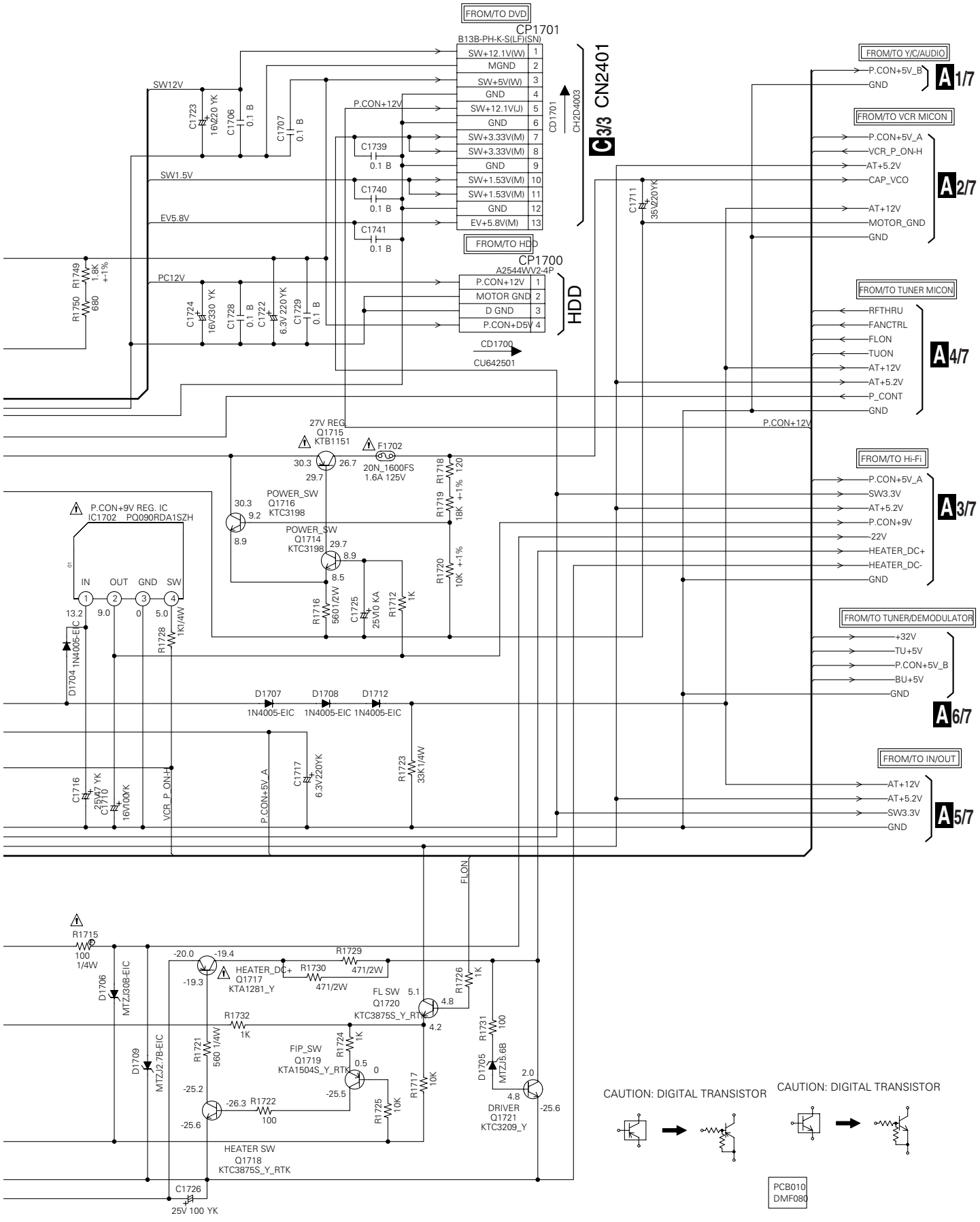

C309
0.1 B
L302
22uH
BU+5V
C301
6.3V 1000 YK
C302
0.0022 B
TU301
TMQZ2-440A
5.0 1 BB
0 NC 2
0 NC 3
0 4
0 NC 5
2.4 NC 6
1.5 7 SIF
0 8
4.8 9 SCL
4.8 10 SDA
1.5 11 AGC
4.8 12 MB
0 NC 13
30.4 14 TU
0 15
2.4 NC 16 AFT
1.7 17 V.OUT
SCL_T
SDA_T
C306
16V22 KA
0
1.5
R301
1K
2.1
Q301 BUFFER
KTA1504S_Y_RTK
AGC
R306
10K
R303
100 1/4W
C305
33PCH
C303
33PCH
R302
100 1/4W
L301
22uH
TU+5V
C308
6.3V 1000 YK
C310
0.0022 B
R317
1K 1/4W
+32V
TU_V
BUFFER
Q302
KTA1504S_Y_RTK
5.0
0
R318
100
0
C304
0.022 B

3.9 SERVICE VCR ASSY(7/7)

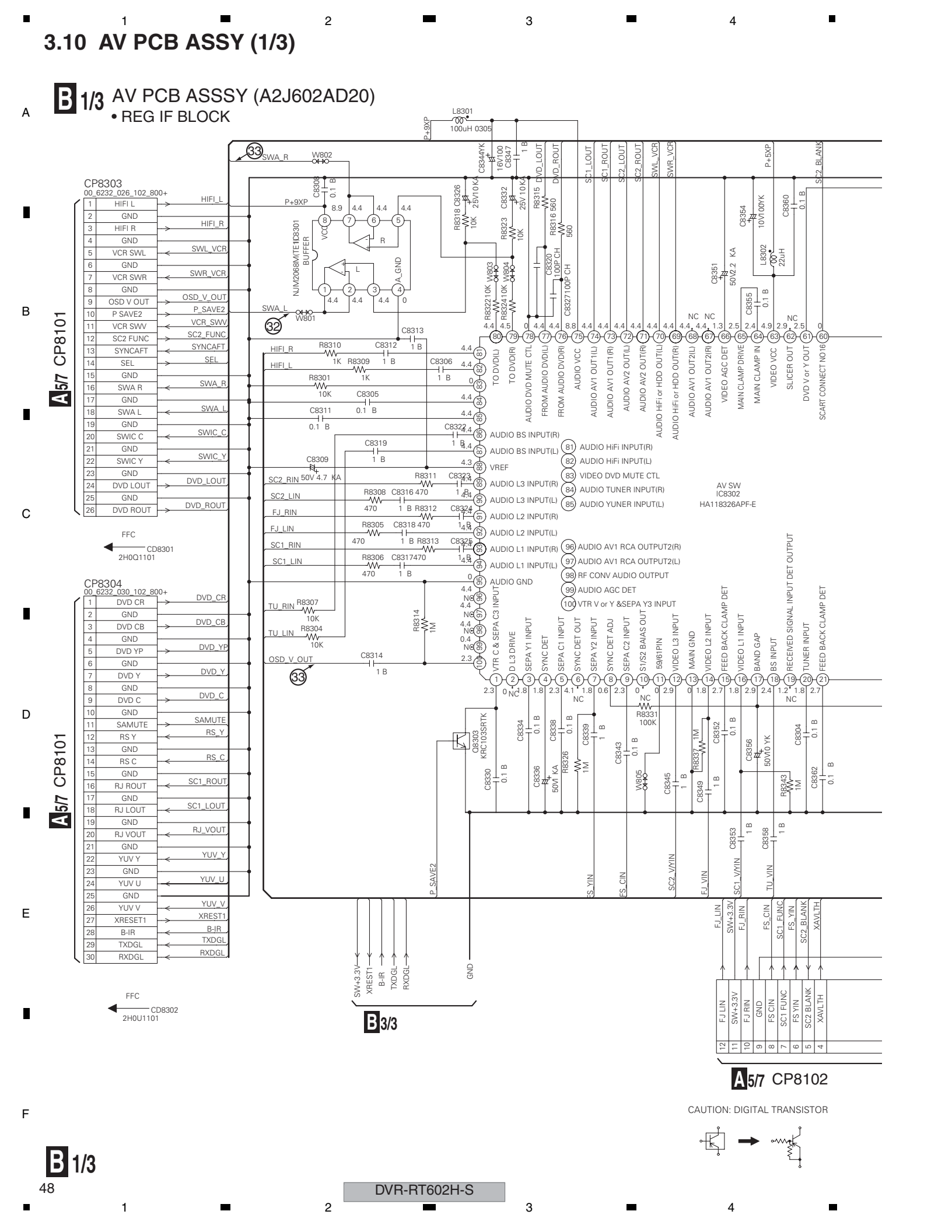
A 7/7 SERVICE VCR ASSY (VXX3190)
• REGULATOR BLOCK

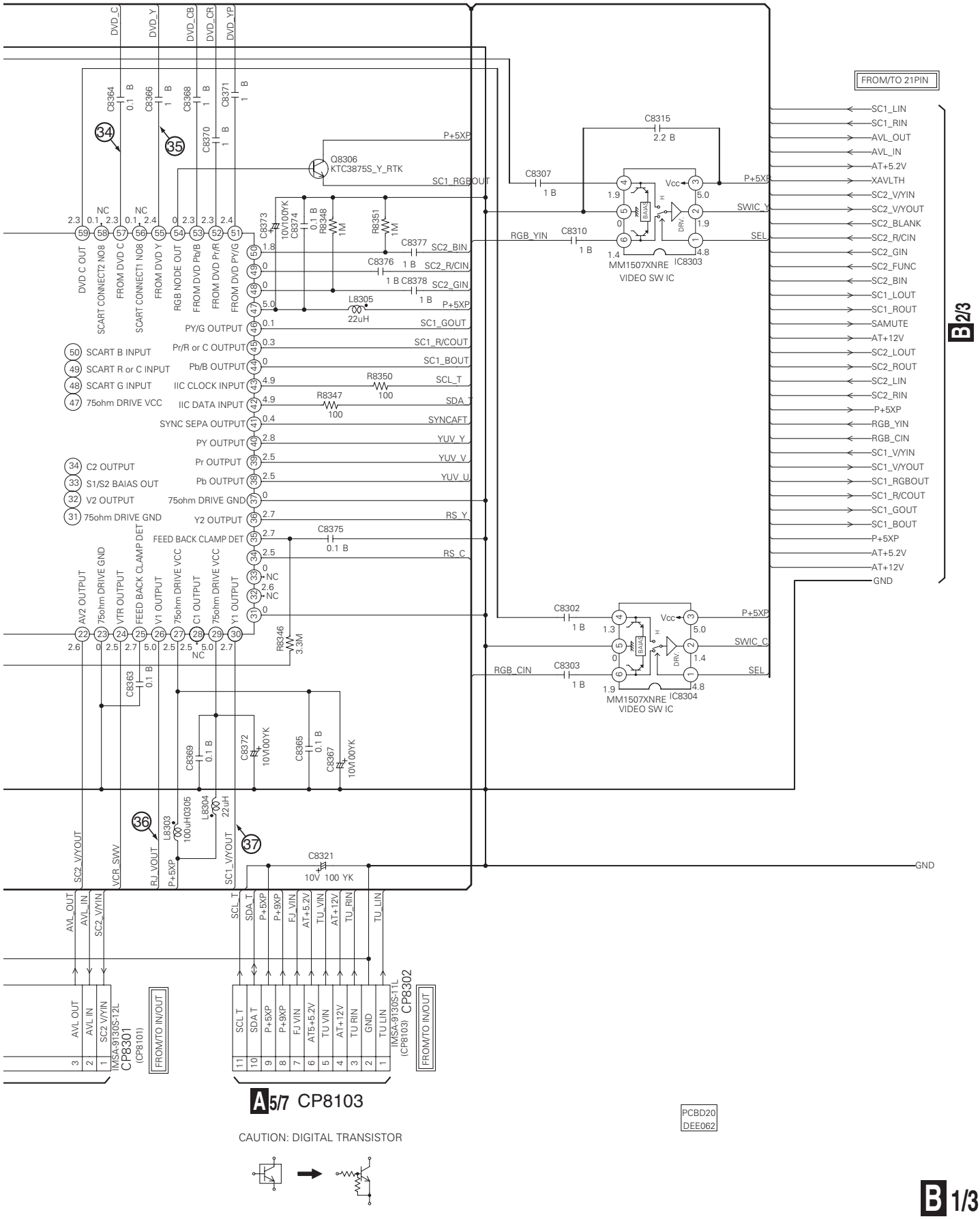


NOTE:THE DC VOLTAGE EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.


FROM/TO DVD
CP1701
B13B-PH-K-S(LF)(SN)
SW+12.1V(W) 1
MGND 2
SW+5V(W) 3
GND 4
SW+12.1V(J) 5
GND 6
SW+3.33V(M) 7
SW+3.33V(M) 8
GND 9
SW+1.53V(M) 10
SW+1.53V(M) 11
GND 12
EV+5.8V(M) 13
CD1701
CH2D4003
C3/3 CN2401
FROM/TO HDD
CP1700
A2544WV-2-4P
P.CON+12V 1
MOTOR GND 2
D GND 3
P.CON+D5V 4
HDD
CD1700
CU642501
SW12V
SW1.5V
EV5.8V
PC12V
P.CON+12V
C1723 16V220 YK
C1706 0.1 B
C1707 0.1 B
C1739 0.1 B
C1740 0.1 B
C1741 0.1 B
C1724 16V330 YK
C1728 0.1 B
C1722 6.3V 220YK
C1729 0.1 B
C1711 35V220YK
R1749 1.8K +-1%
R1750 680
FROM/TO Y/C/AUDIO
P.CON+5V_B
GND
A1/7
FROM/TO VCR MICON
P.CON+5V_A
VCR_P_ON-H
AT+5.2V
CAP_VCO
AT+12V
MOTOR_GND
GND
A2/7
FROM/TO TUNER MICON
RFTHRU
FANCTRL
FLON
TUON
AT+12V
AT+5.2V
P_CONT
GND
A4/7
P.CON+12V
27V REG.
Q1715
KTB1151
F1702
20N_1600FS
1.6A 125V
30.3
26.7
29.7
R1718 120
R1719 18K +-1%
R1720 10K +-1%
POWER_SW
Q1716
KTC3198
30.3
9.2
8.9
POWER_SW
Q1714
KTC3198
29.7
8.9
8.5
P.CON+9V REG. IC
IC1702 PQ090RDA1SZH
IN OUT GND SW
1 2 3 4
13.2 9.0 0 5.0
R1716 560 1/2W
C1725 25V10 KA
R1712 1K
R1728 1K1/4W
D1704 1N4005-EIC
FROM/TO Hi-Fi
P.CON+5V_A
SW3.3V
AT+5.2V
P.CON+9V
-22V
HEATER_DC+
HEATER_DC-
GND
A3/7
FROM/TO TUNER/DEMODULATOR
+32V
TU+5V
P.CON+5V_B
BU+5V
GND
A6/7
D1707 1N4005-EIC
D1708 1N4005-EIC
D1712 1N4005-EIC
C1716 25V47 YK
C1710 16V100 YK
VCR_P_ON-H
P.CON+5V_A
C1717 6.3V220YK
R1723 33K 1/4W
FROM/TO IN/OUT
AT+12V
AT+5.2V
SW3.3V
GND
A5/7
FLON
R1715 100 1/4W
D1706 MTZJ30B-EIC
D1709 MTZJ2.7B-EIC
HEATER_DC+
Q1717
KTA1281_Y
-20.0
-19.4
-19.3
R1729
R1730 471/2W
471/2W
FL SW
Q1720
KTC3875S_Y_RTK
5.1
4.8
4.2
R1726 1K
R1732 1K
R1721 560 1/4W
FIP_SW
Q1719
KTA1504S_Y_RTK
R1724 1K
0.5
0
-25.5
-25.2
-26.3
R1722 100
-25.6
R1717 10K
R1725 10K
R1731 100
D1705 MTZJ5.6B
2.0
4.8
-25.6
DRIVER
Q1721
KTC3209_Y
HEATER SW
Q1718
KTC3875S_Y_RTK
C1726 25V 100 YK
CAUTION: DIGITAL TRANSISTOR
CAUTION: DIGITAL TRANSISTOR
PCB010
DMF080
A7/7

3.10 AV PCB ASSY (1/3)

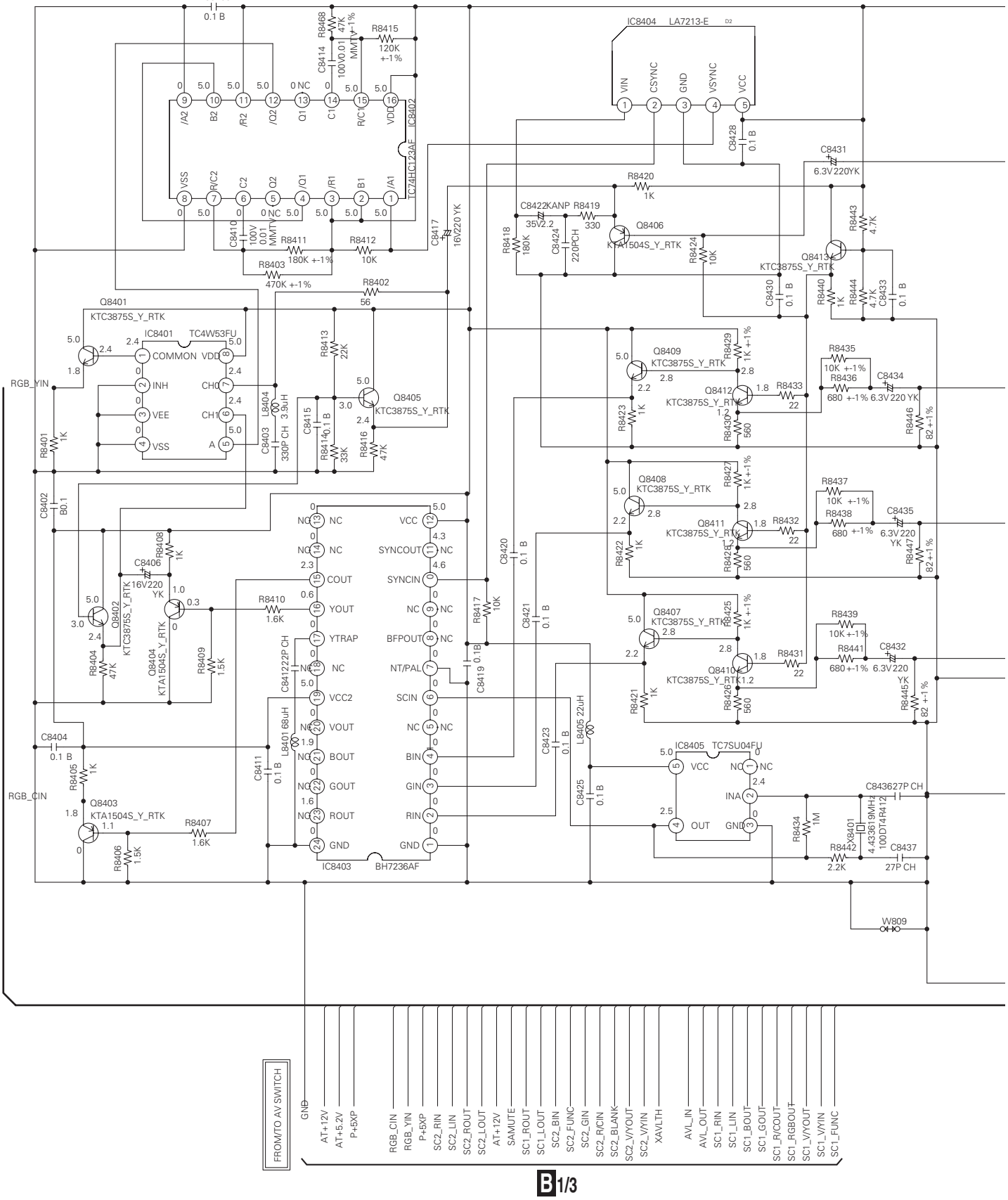



FROM/TO 21PIN
SC1_LIN
SC1_RIN
AVL_OUT
AVL_IN
AT+5.2V
XAVLTH
SC2_V/YIN
SC2_V/YOUT
SC2_BLANK
SC2_R/CIN
SC2_GIN
SC2_FUNC
SC2_BIN
SC1_LOUT
SC1_ROUT
SAMUTE
AT+12V
SC2_LOUT
SC2_ROUT
SC2_LIN
SC2_RIN
P+5XP
RGB_YIN
RGB_CIN
SC1_V/YIN
SC1_V/YOUT
SC1_RGBOUT
SC1_R/COUT
SC1_GOUT
SC1_BOUT
P+5XP
AT+5.2V
AT+12V
GND
B2/3
C8315
2.2 B
C8307
1 B
C8310
1 B
C8302
1 B
C8303
1 B
MM1507XNRE
VIDEO SW IC
IC8303
IC8304
SWIC_Y
SWIC_C
SEL
RGB_YIN
RGB_CIN
Q8306
KTC3875S_Y_RTK
SC1_RGBOUT
L8305
22uH
C8377
SC2_BIN
C8376
SC2_R/CIN
C8378
SC2_GIN
C8373
C8374
R8348
1M
R8351
1M
R8350
100
R8347
100
R8346
3.3M
C8363
C8369
C8372
C8365
C8367
L8303
100uH0305
L8304
22uH
C8321
10V 100 YK
DVD_C
DVD_Y
DVD_CB
DVD_CR
DVD_YP
C8364
C8366
C8368
C8370
C8371
DVD C OUT
SCART CONNECT2 NO8
FROM DVD C
SCART CONNECT1 NO8
FROM DVD Y
RGB NODE OUT
FROM DVD Pb/B
FROM DVD Pr/R
FROM DVD PY/G
PY/G OUTPUT
Pr/R or C OUTPUT
Pb/B OUTPUT
IIC CLOCK INPUT
IIC DATA INPUT
SYNC SEPA OUTPUT
PY OUTPUT
Pr OUTPUT
Pb OUTPUT
Y2 OUTPUT
FEED BACK CLAMP DET
SCART B INPUT
SCART R or C INPUT
SCART G INPUT
75ohm DRIVE VCC
C2 OUTPUT
S1/S2 BAIAS OUT
V2 OUTPUT
75ohm DRIVE GND
AV2 OUTPUT
VTR OUTPUT
V1 OUTPUT
C1 OUTPUT
Y1 OUTPUT
SC1_GOUT
SC1_R/COUT
SC1_BOUT
SCL_T
SDA_T
SYNCAFT
YUV_Y
YUV_V
YUV_U
RS_Y
RS_C
SC2_V/YOUT
VCR_SWV
RJ_VOUT
SC1_V/YOUT
SCL_T
SDA_T
P+5XP
P+9XP
FJ_VIN
AT+5.2V
TU_VIN
AT+12V
TU_RIN
TU_LIN
GND
AVL_OUT
AVL_IN
SC2_V/YIN
IMSA-9130S-12L
CP8301
(CP8101)
FROM/TO IN/OUT
SCL T
SDA T
P+5XP
P+9XP
FJ VIN
AT5+5.2V
TU VIN
AT+12V
TU RIN
GND
TU LIN
IMSA-9130S-11L
(CP8103) CP8302
FROM/TO IN/OUT
A5/7 CP8103
PCBD20
DEE062
CAUTION: DIGITAL TRANSISTOR
B1/3

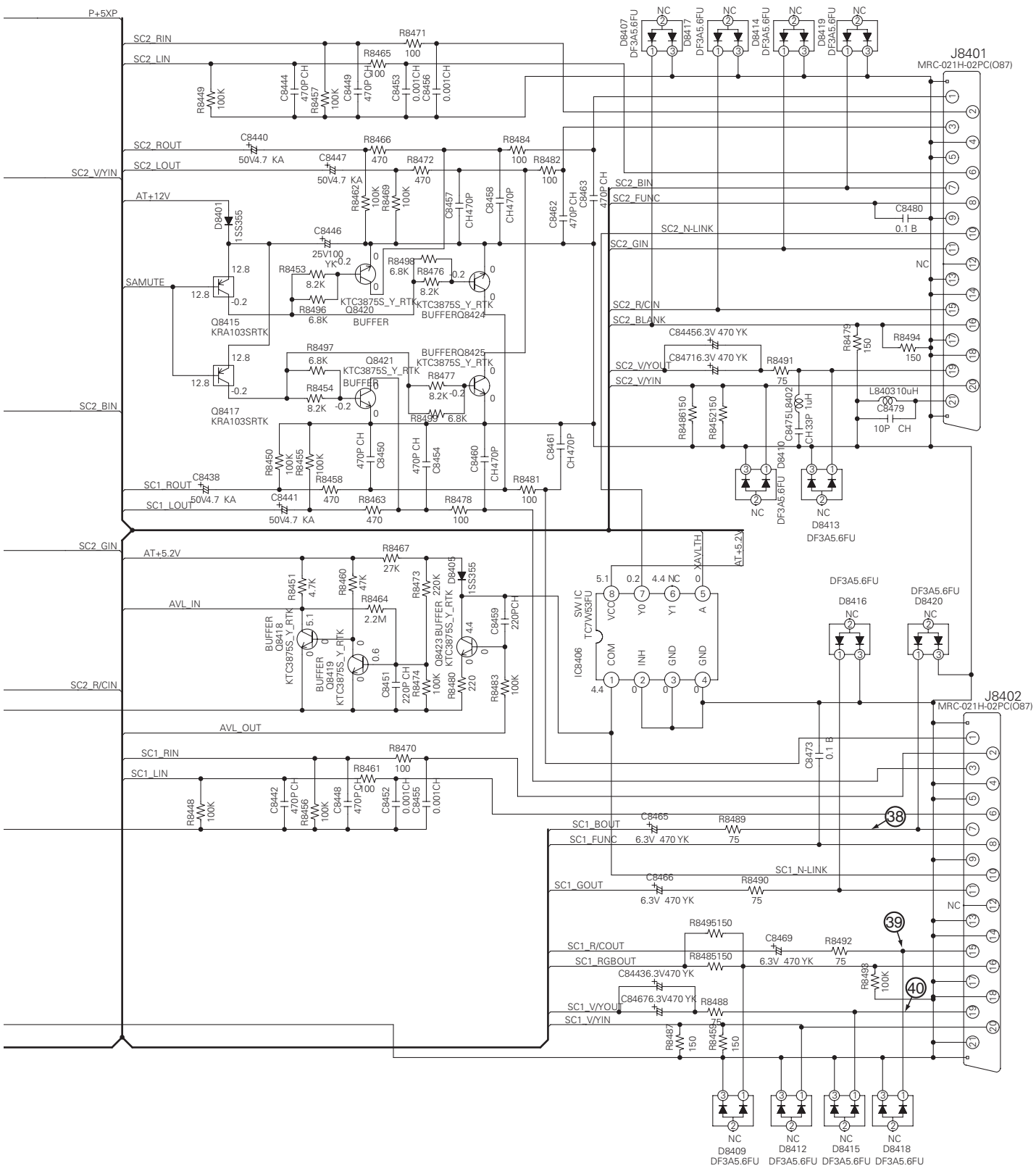
3.11 AV PCB ASSY (2/3)

B 2/3 AV PCB ASSSY (A2J602AD20)

• 21 PIN BLOCK



B 2/3



CAUTION: DIGITAL TRANSISTOR

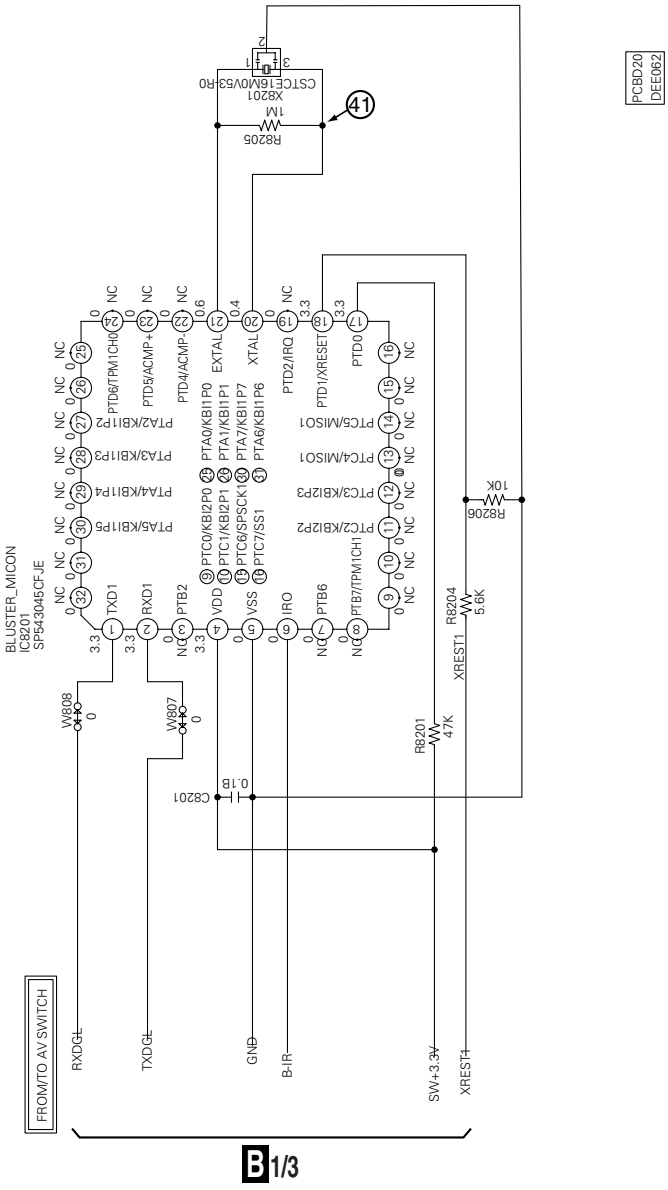
CAUTION: DIGITAL TRANSISTOR

PCBD20
DEE062

3.12 AV PCB ASSY (3/3)

B 3/3 AV PCB ASSSY (A2J602AD20)

•IR BLASTER BLOCK



A

B

C

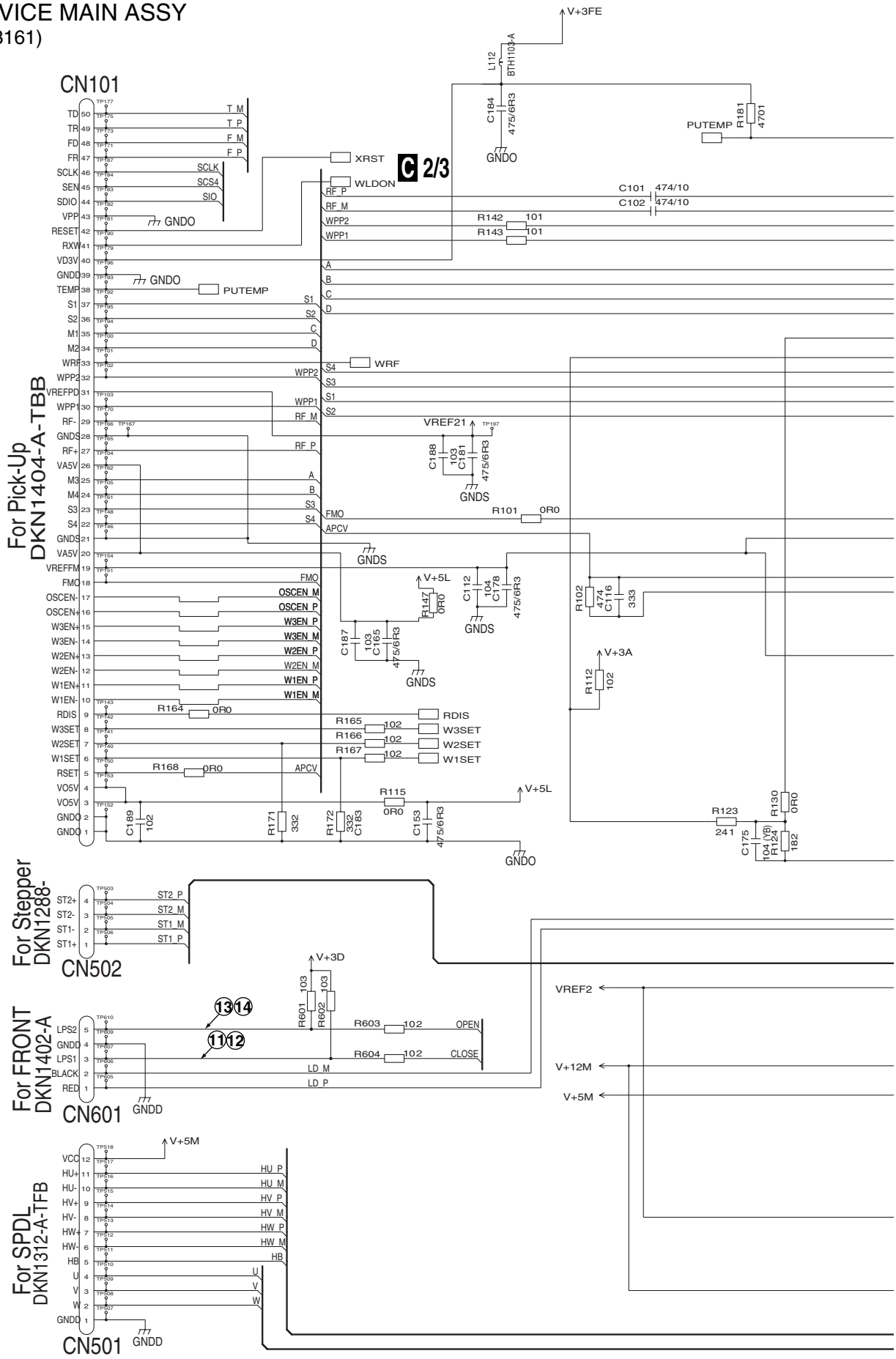
D

E

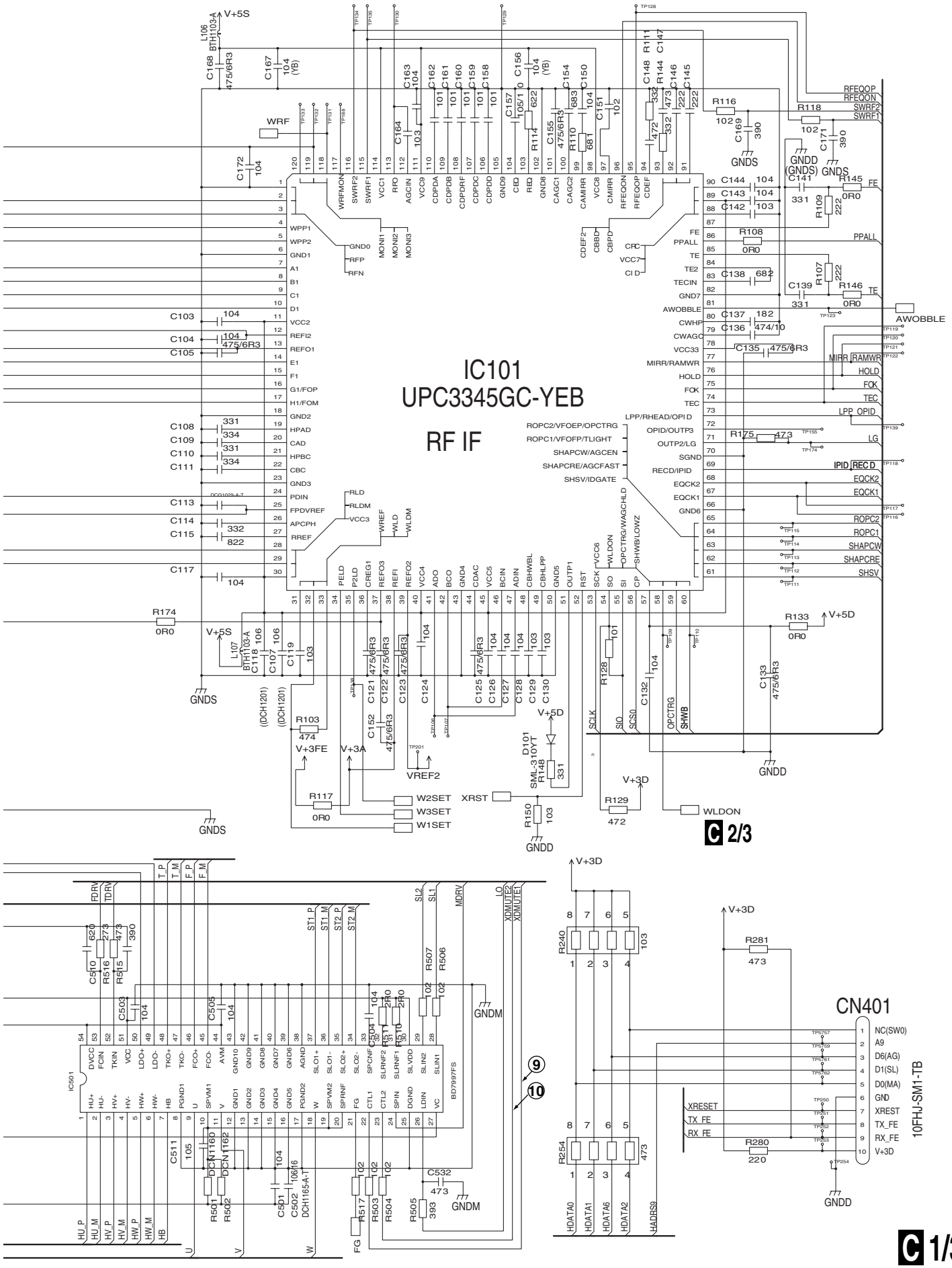
F

3.13 SERVICE MAIN ASSY(1/3)

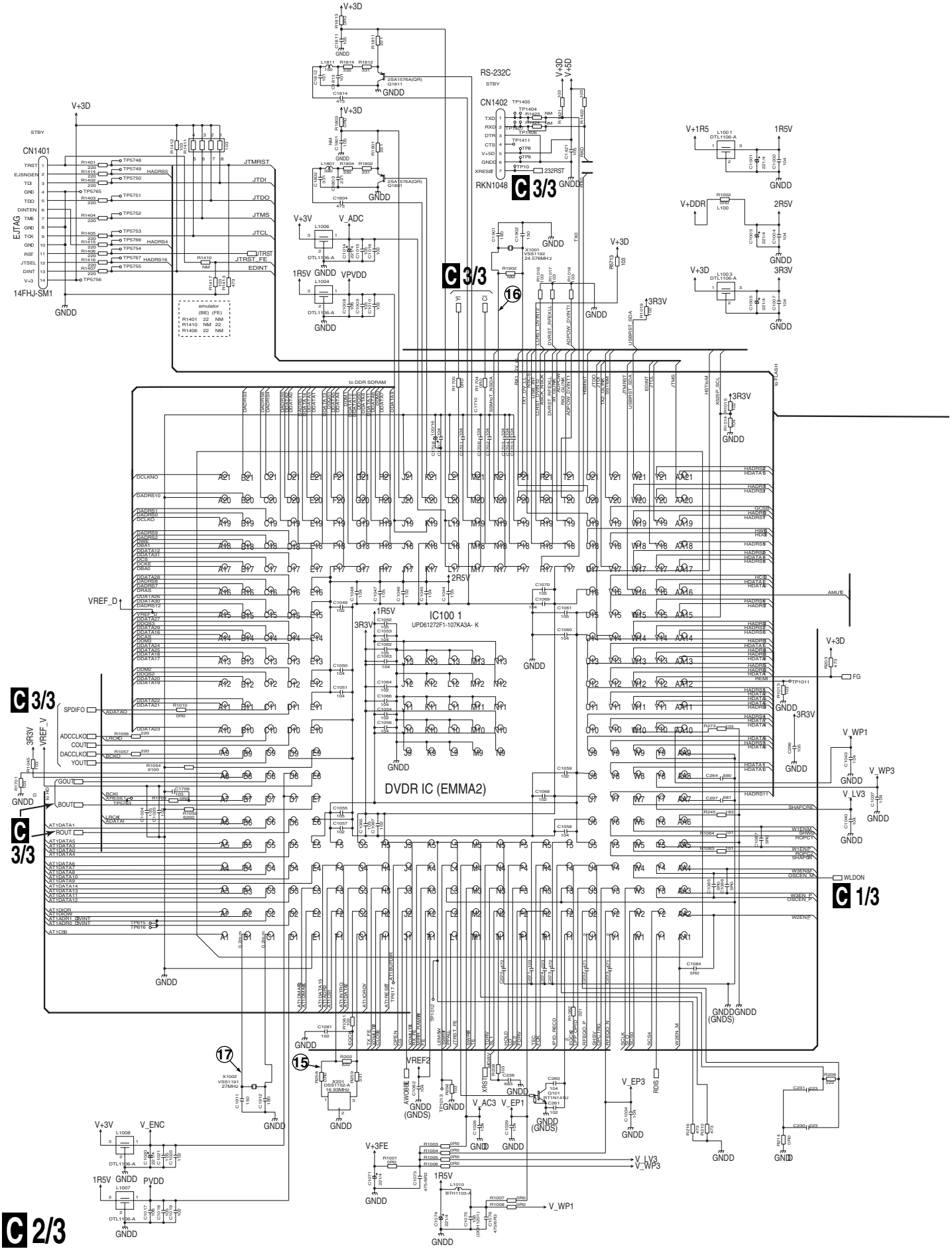
C 1/3 SERVICE MAIN ASSY
(VXX3161)



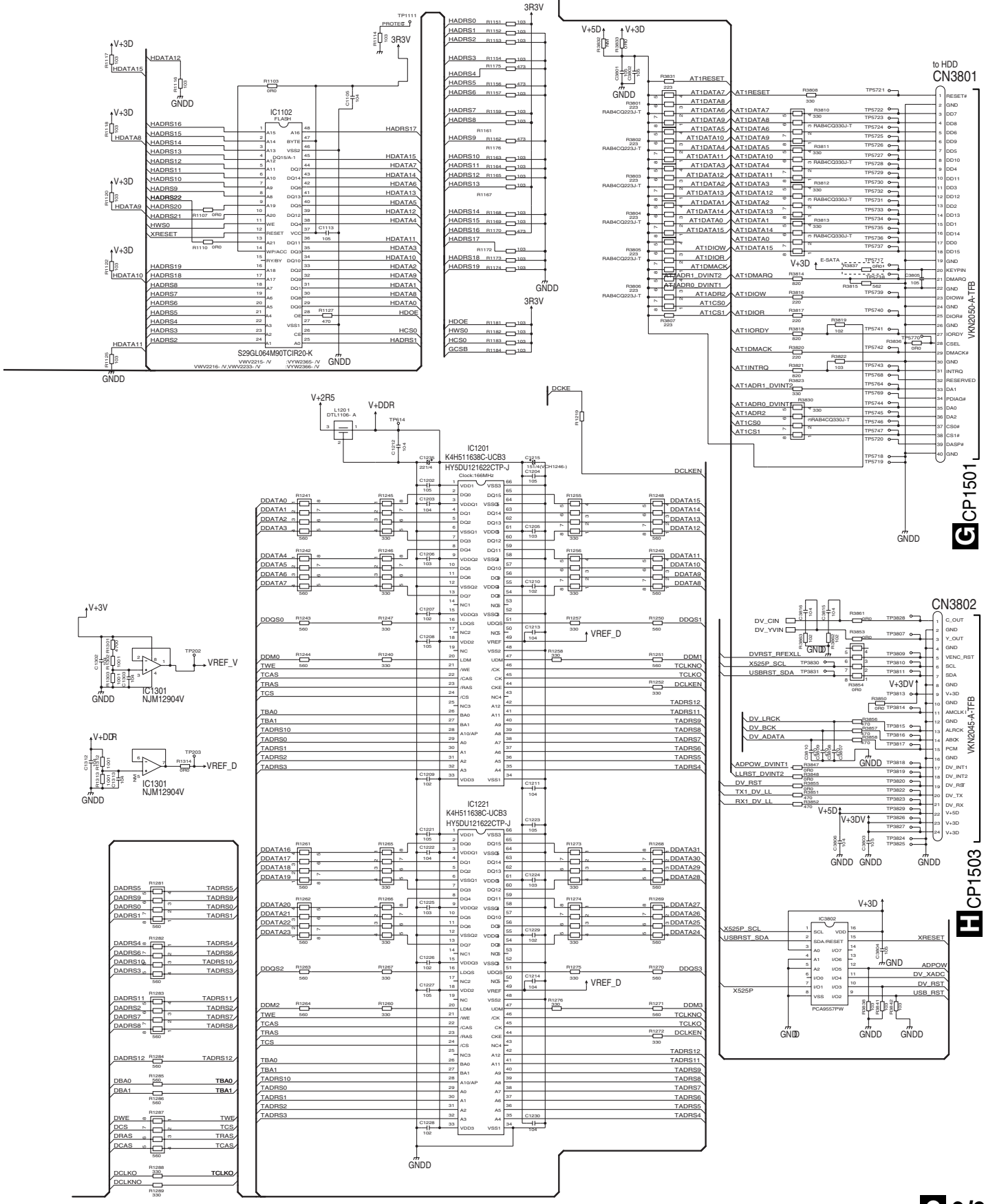
C 1/3


IC101
UPC3345GC-YEB
RF IF
C 2/3
C 1/3
CN401
10FHJ-SM1-TB
IC501
BD7997FS
DVR-RT602H-S
55

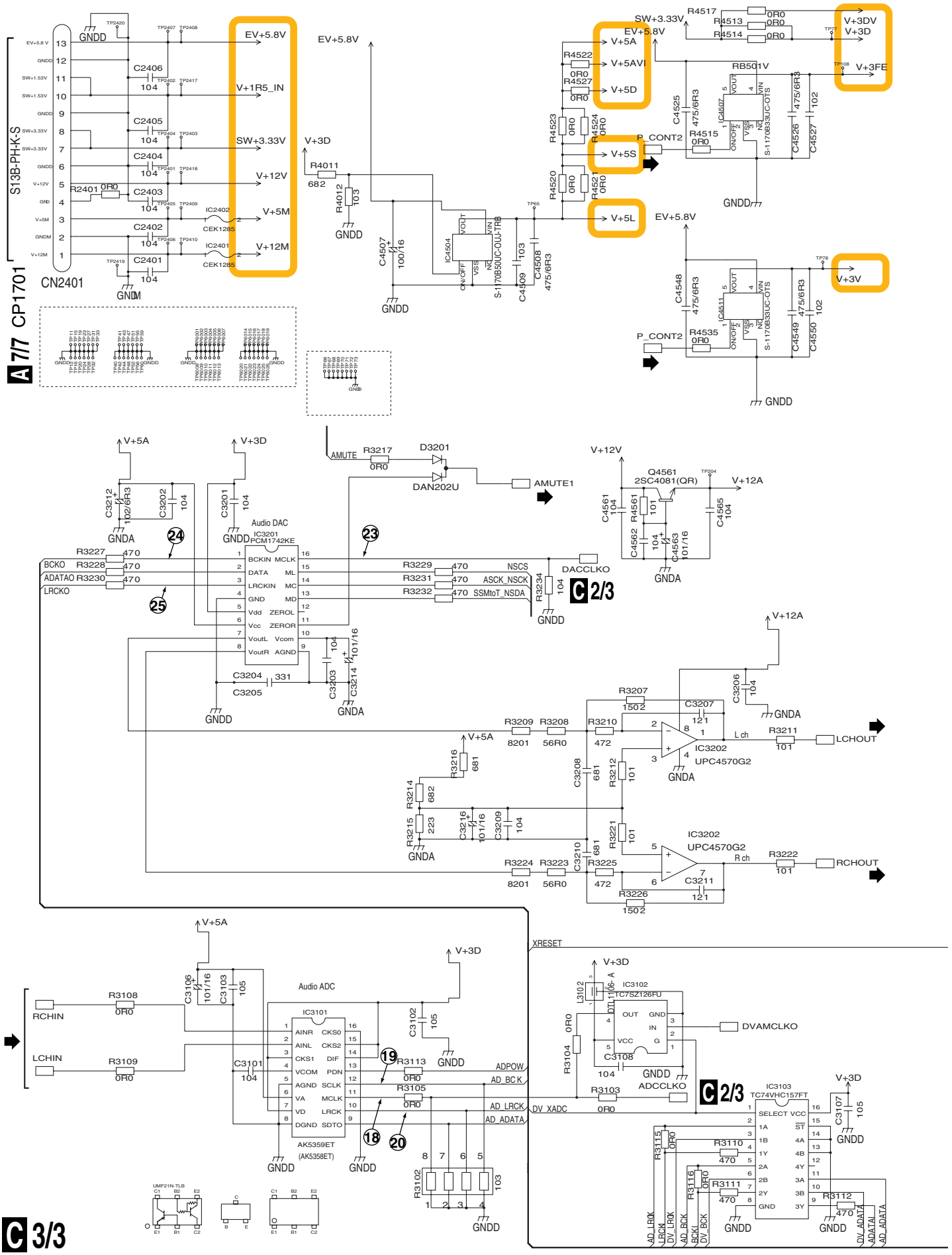
3.14 SERVICE MAIN ASSY(2/3)



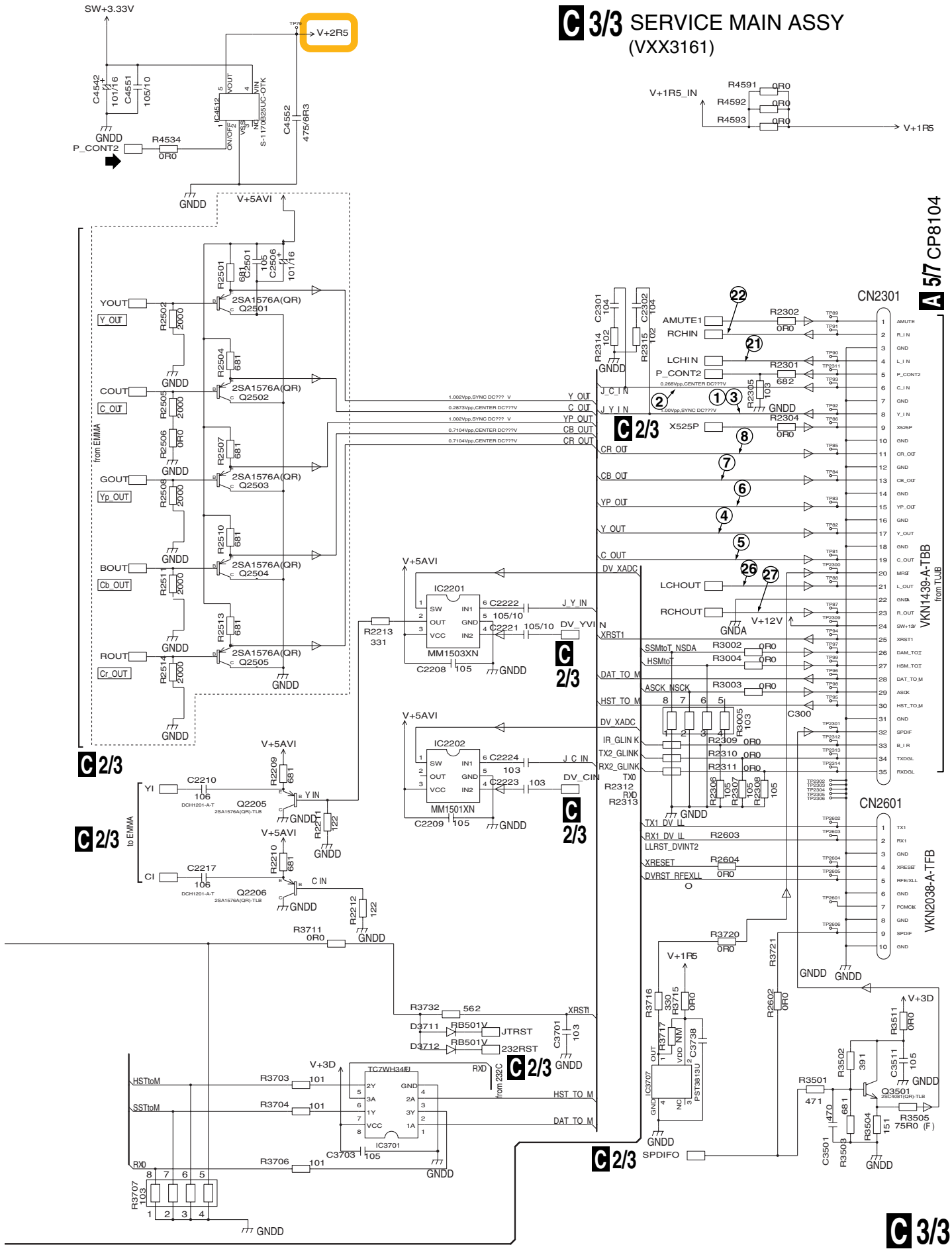
C 2/3 SERVICE MAIN ASSY (VXX3161)



3.15 SERVICE MAIN ASSY(3/3)

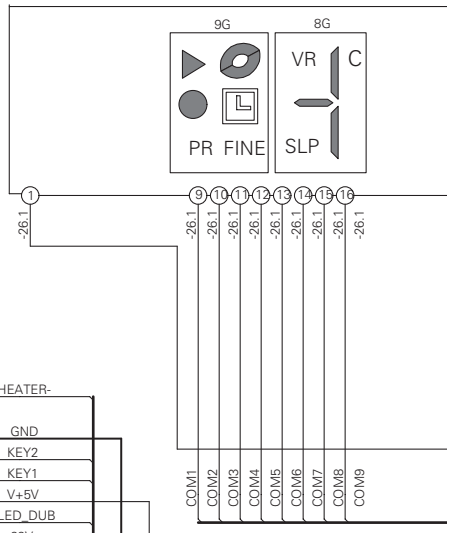


C 3/3 SERVICE MAIN ASSY
(VXX3161)



3.16 DISPLAY PCB, OPERATION 1 and 2 PCB ASSYS

D DISPLAY PCB ASSY (A2J602ADP0)



FROM/TO IN/OUT2

CP654 (CP8003)
IMSA-9615S-18C-PP-A

A3/7 CP8003

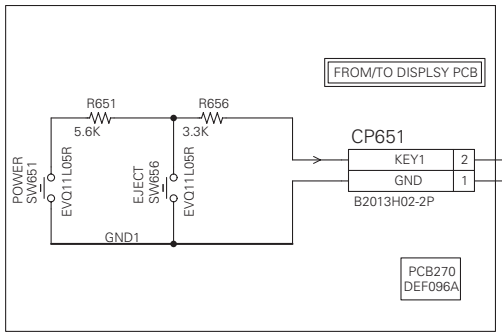
1	HEATER DC-	HEATER-
2	GND	
3	GND	GND
4	KEY2	KEY2
5	KEY1	KEY1
6	V+5V	V+5V
7	LED_DUB	LED_DUB
8	-22V	-22V
9	KEY3	KEY3
10	FLDATA	FLDATA
11	FLCLK	FLCLK
12	FLSTB	FLSTB
13	REM_IN	REM_IN
14	LED_HDD	LED_HDD
15	LED_DVD	LED_DVD
16	NC	NC
17	LED_SATA	LED_SATA
18	HEATER DC+	HEATER+

W819

FIP DRIVER
IC651
PT6315

COM9	-23.0
COM8	-23.0
COM7	-19.9
COM6	-19.8
COM5	-19.9
COM4	-19.9
COM3	-19.9
COM2	-19.8
COM1	-19.9

E OPERATION 1 PCB ASSY (A2J602A270)



FROM/TO OPERATION1 PCB

CP652
2 KEY1
1 GND
B2013H02-2P

CD652
W9L6018038

C663+ 6.3V 100 KA
C664 0.1 B

R659 2.2K 1/4W
R662 2.2K 1/4W
R665 10K1/4W KEY1
C662 0.001 B
HELP SW662 EVQ11L05R
PLAY SW665 EVQ11L05R
C659 0.1 B

R666 10K1/4W KEY2
C651 0.1 B
5.2
0

R652WIRE 12K
R654 5.6K 1/4W
R657 3.3K
R660 2.2K
R663 2.2K
DUB_ENTER SW652 EVQ11L05R
DUBBING SW654 EVQ11L05R
DUBBING_SELECT SW657 EVQ11L05R
>>/RIGHT SW660 EVQ11L05R
<</LEFT SW663 EVQ11L05R
STOP SW666 EVQ11L05R
C660 0.1 B

R667 10K KEY3

R653 12K
R655 5.6K
R658 3.3K
R661 2.2K
R664 2.2K
CH-/DOWN SW653 EVQ11L05R
CH+/UP SW655 EVQ11L05R
REC_STOP SW661 EVQ11L05R
OPEN/CLOSE SW664 EVQ11L05R
REC SW667 EVQ11L05R
C661 0.1 B

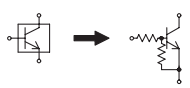
SWICHES

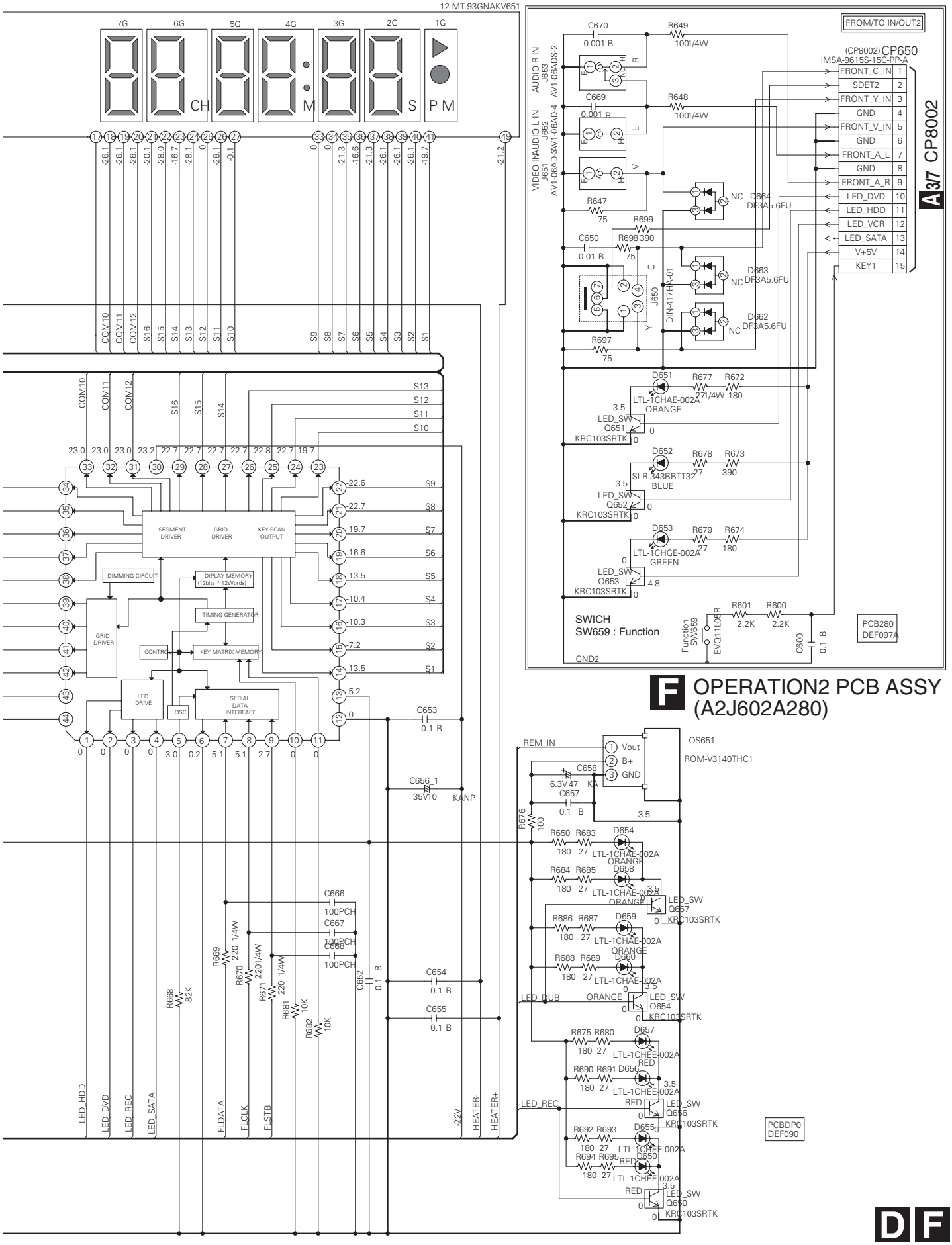
SW651 : POWER
SW656 : EJECT

SWITCHES

SW652 : DUB ENTER
SW653 : CH-/DOWN
SW654 : DUBBING
SW655 : CH+/UP
SW657 : DUBBING SELECT
SW660 : >>/RIGHT
SW661 :REC STEP
SW662 : HELP
SW663 : <</LEFT
SW664 : OPEN/CLOSE
SW665 : PLAY
SW666 : STOP
SW667 : REC

CAUTION: DIGITAL TRANSISTOR

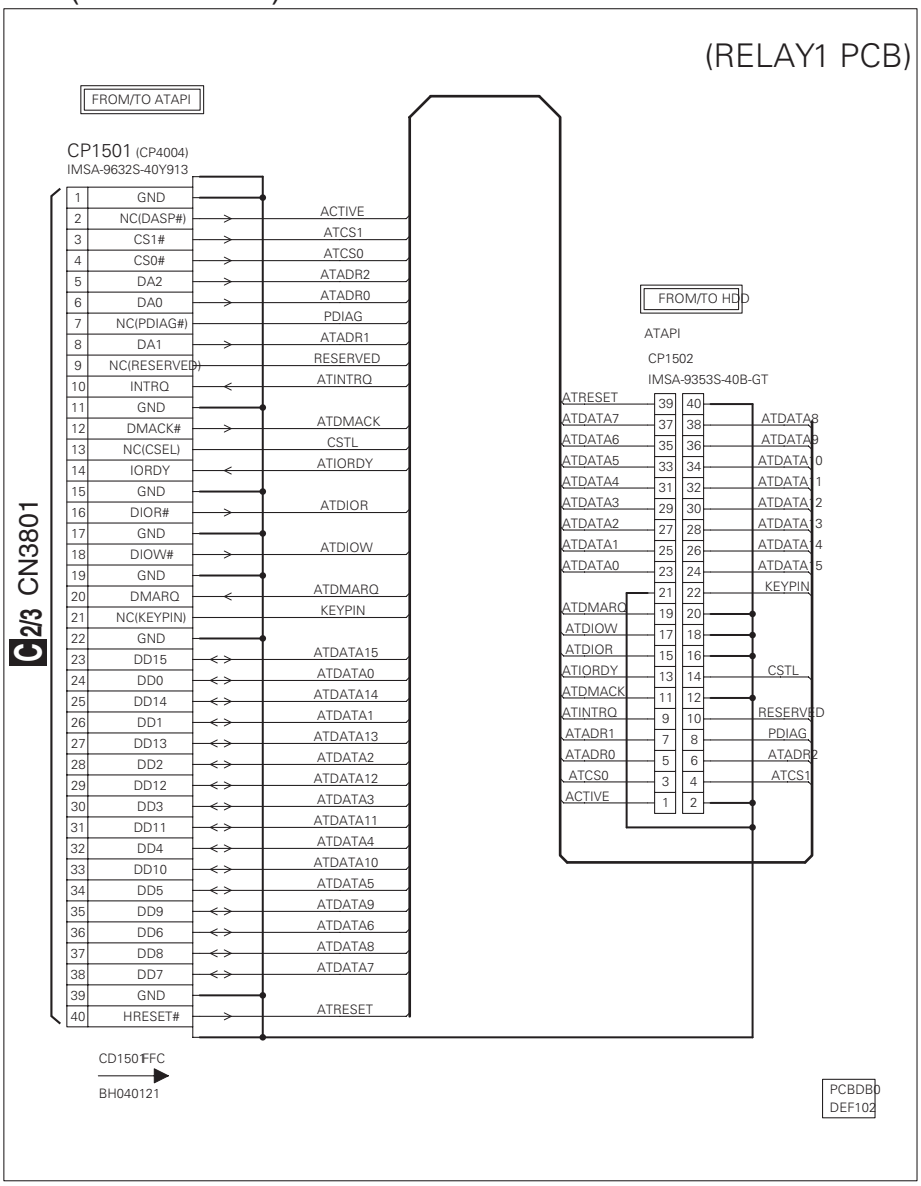




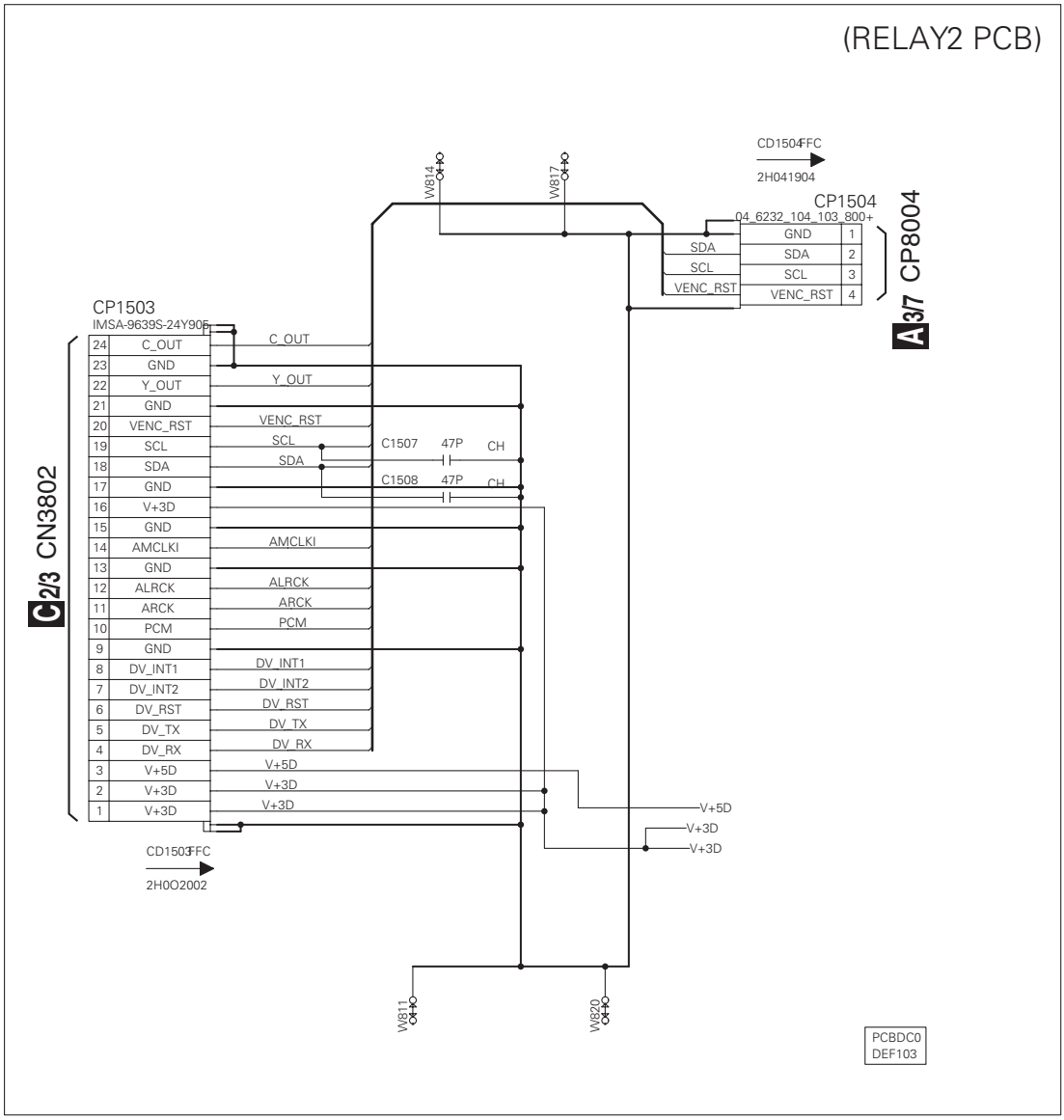
F OPERATION2 PCB ASSY (A2J602A280)

3.17 RELAY 1 and 2 PCB ASSYS

G RELAY1 PCB ASSY (A2J602ADB0)

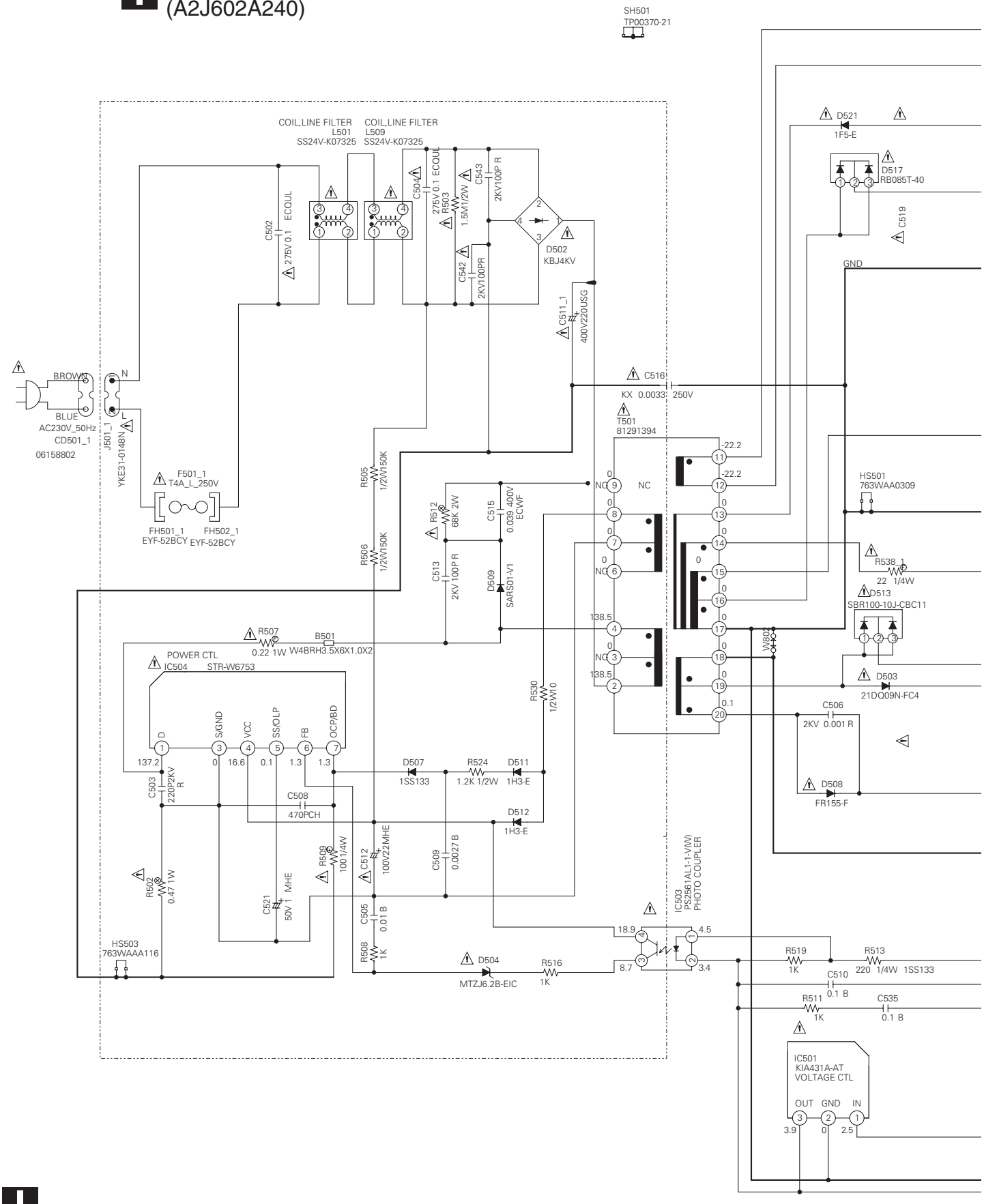


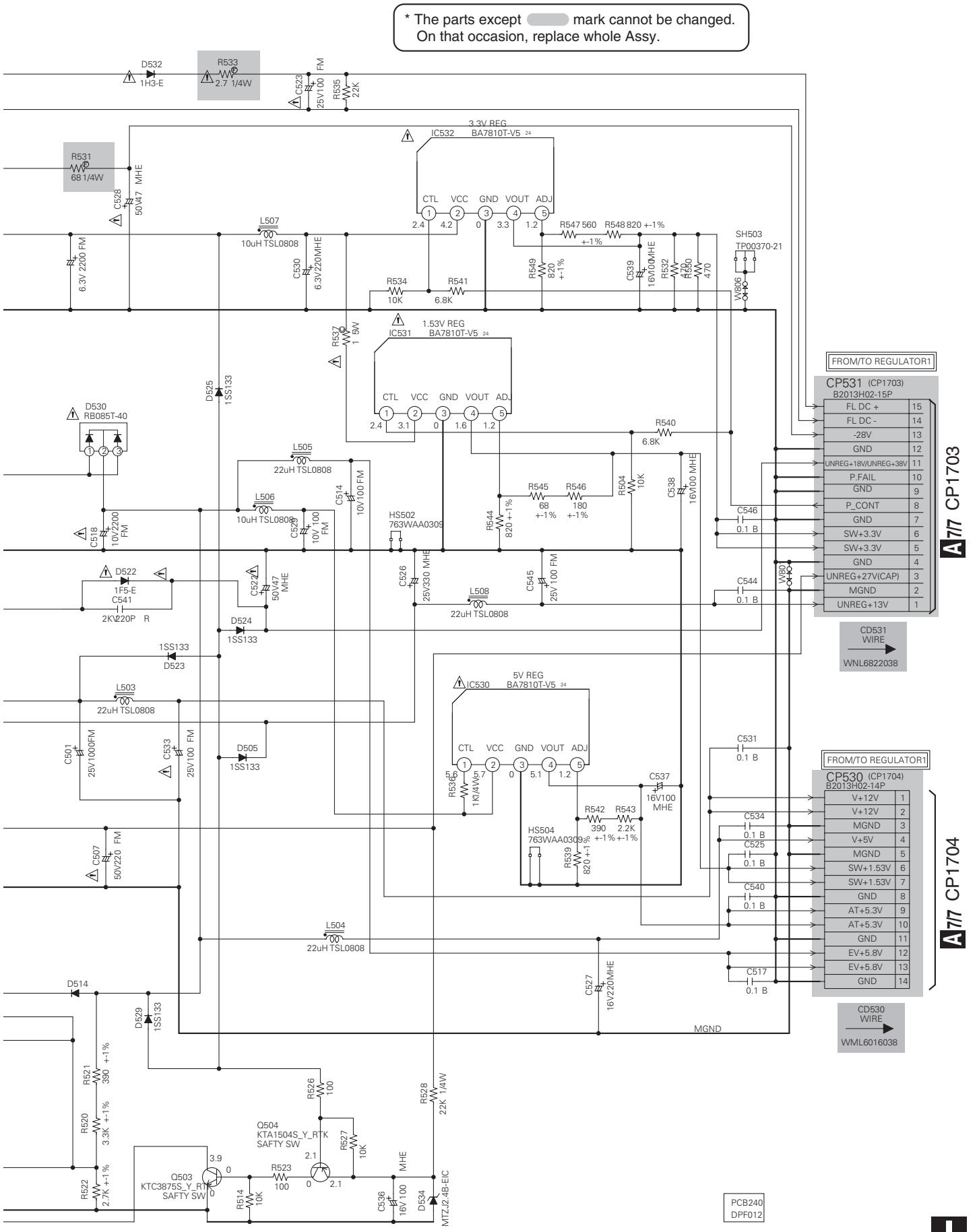
H RELAY2 PCB ASSY (A2J602ADC0)



3.18 POWER PCB ASSY

POWER PCB ASSY (A2J602A240)



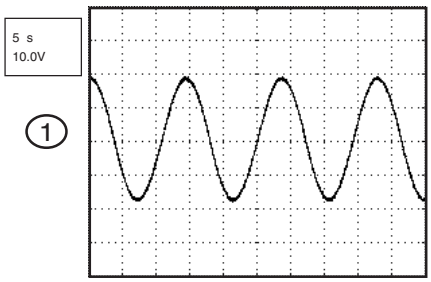

* The parts except mark cannot be changed.
On that occasion, replace whole Assy.
D532 1H3-E
R533 2.7 1/4W
C523 25V100 FM
R535 22K
3.3V REG
IC532 BA7810T-V5
CTL VCC GND VOUT ADJ
2.4 4.2 0 3.3 1.2
R531 68 1/4W
C528 50V47 MHE
L507 10uH TSL0808
C530 6.3V220MHE
C529 6.3V 2200 FM
R534 10K
R541 6.8K
R547 560
R548 820 +-1%
R549 820 +-1%
C539 16V100MHE
R532 470
SH503 TP00370-21
W906
1.53V REG
IC531 BA7810T-V5
R537 1 5W
CTL VCC GND VOUT ADJ
2.4 3.1 0 1.6 1.2
D525 1SS133
D530 RB085T-40
R540 6.8K
L505 22uH TSL0808
L506 10uH TSL0808
C514 10V100 FM
C518 10V2200 FM
C529 10V 100 FM
HS502 763WAA0309
R544 820 +-1%
R545 68 +-1%
R546 180 +-1%
R504 10K
C538 16V100 MHE
C546 0.1 B
D522 1F5-E
C541 2KV220P R
C522 50V47 MHE
C526 25V330 MHE
C545 25V 100 FM
L508 22uH TSL0808
C544 0.1 B
W904
D524 1SS133
1SS133 D523
L503 22uH TSL0808
C501 25V1000FM
C533 25V100 FM
D505 1SS133
5V REG
IC530 BA7810T-V5
CTL VCC GND VOUT ADJ
5.6 5.7 0 5.1 1.2
R536 1K/4W
C537 16V100 MHE
C531 0.1 B
R542 390
R543 2.2K
HS504 763WAA0309
R539 820 +-1%
C534 0.1 B
C525 0.1 B
C540 0.1 B
C507 50V220 FM
L504 22uH TSL0808
C527 16V220MHE
C517 0.1 B
D514
D529 1SS133
MGND
R521 390 +-1%
R520 3.3K +-1%
R522 2.7K +-1%
R526 100
R528 22K 1/4W
Q504 KTA1504S_Y_RTK SAFTY SW
R527 10K
Q503 KTC3875S_Y_RTK SAFTY SW
3.9 0 2.1
R523 100
0 2.1
R514 10K
C536 16V 100 MHE
D534 MTZJ2.4B-EIC
FROM/TO REGULATOR1
CP531 (CP1703)
B2013H02-15P
FL DC + 15
FL DC - 14
-28V 13
GND 12
UNREG+18V/UNREG+38V 11
P.FAIL 10
GND 9
P_CONT 8
GND 7
SW+3.3V 6
SW+3.3V 5
GND 4
UNREG+27V(CAP) 3
MGND 2
UNREG+13V 1
A7/7 CP1703
CD531 WIRE
WNL6822038
FROM/TO REGULATOR1
CP530 (CP1704)
B2013H02-14P
V+12V 1
V+12V 2
MGND 3
V+5V 4
MGND 5
SW+1.53V 6
SW+1.53V 7
GND 8
AT+5.3V 9
AT+5.3V 10
GND 11
EV+5.8V 12
EV+5.8V 13
GND 14
A7/7 CP1704
CD530 WIRE
WML6016038
PCB240
DPF012

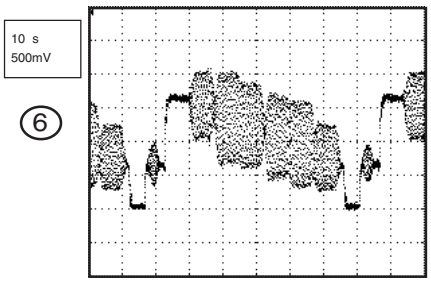
3.19 WAVE FORMS

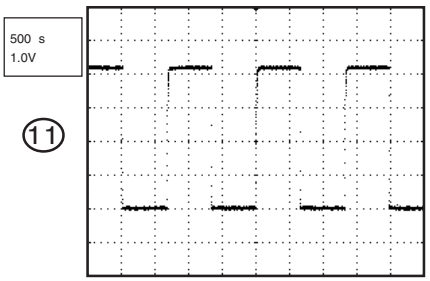
Note : The encircled numbers denote measuring point in the schematic diagram.

A SERVICE VCR ASSY

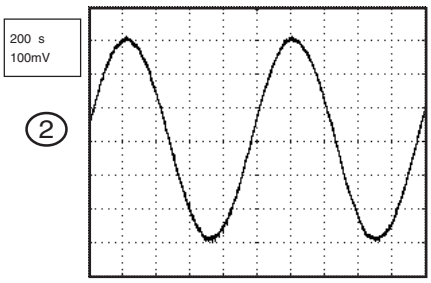
Y/C/AUDIO

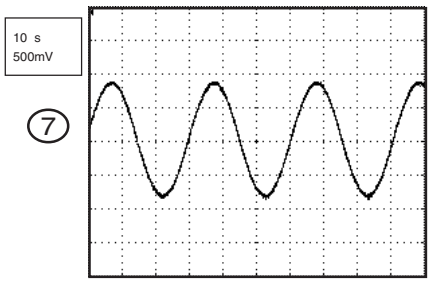


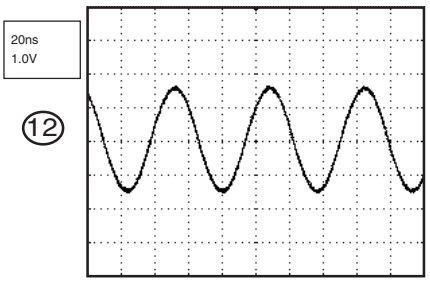


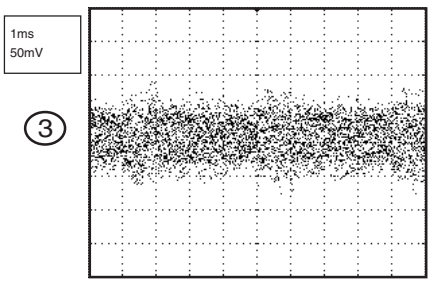


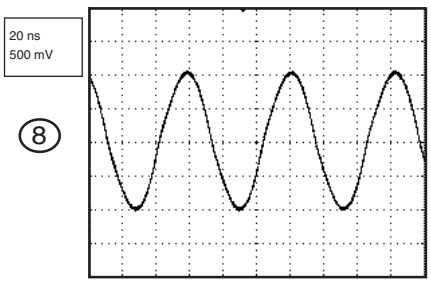
VCR MICON

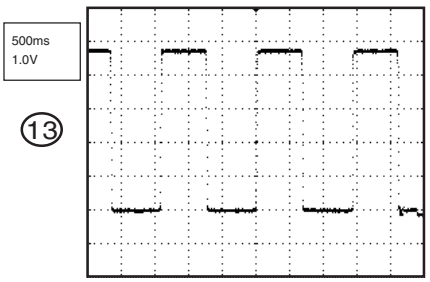


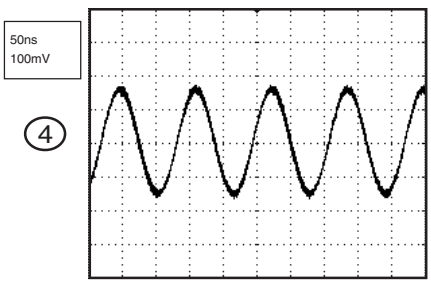


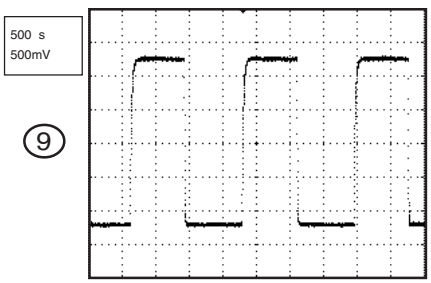


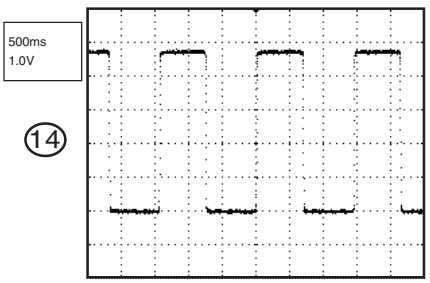




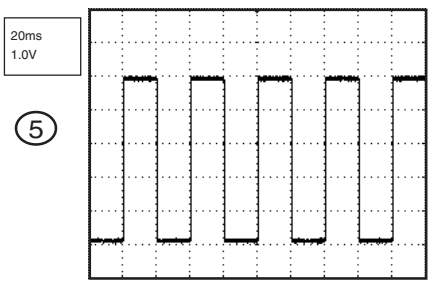


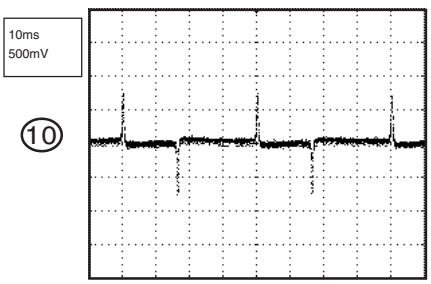


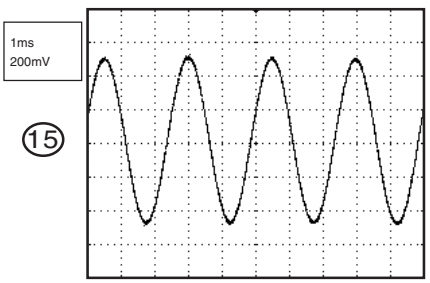




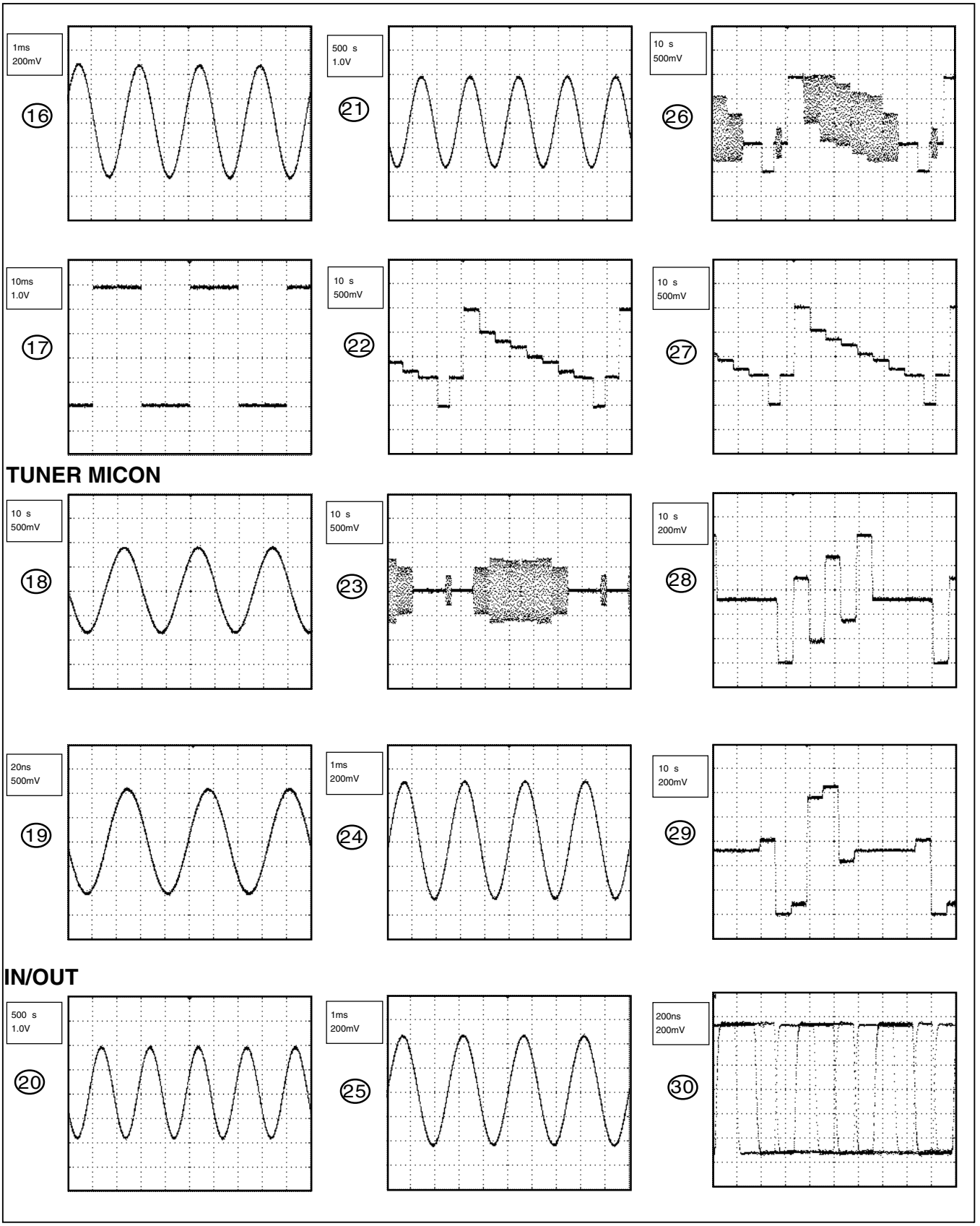
Hi-Fi







A SERVICE VCR ASSY

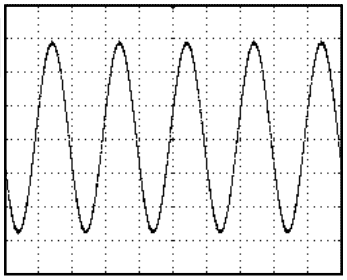


B AV PCB ASSY

AV SWITCH

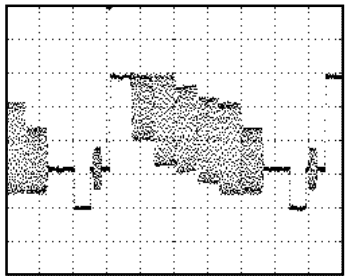
500 s
500mV

(31)



10 s
500mV

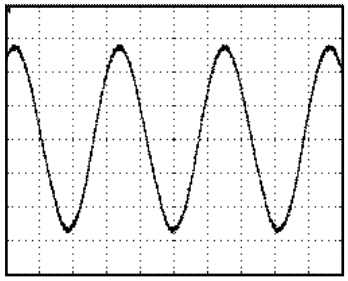
(36)



IR BLASTER

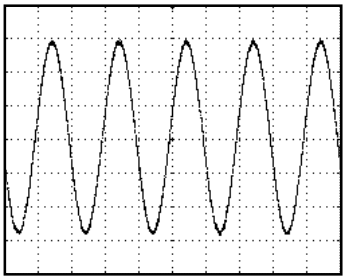
20ns
100mV

(41)



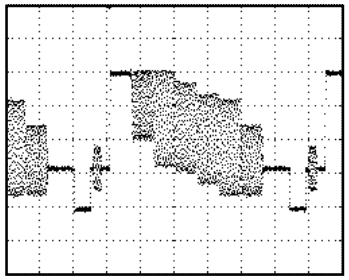
500 s
500mV

(32)



10 s
500mV

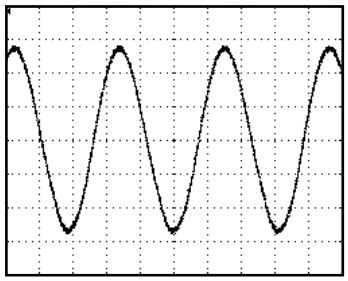
(37)



21PIN

10 s
500mV

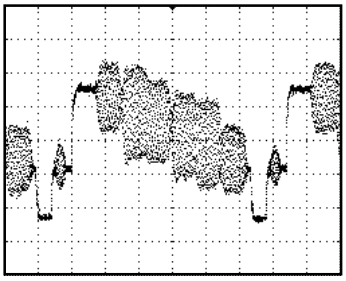
(42)



21PIN

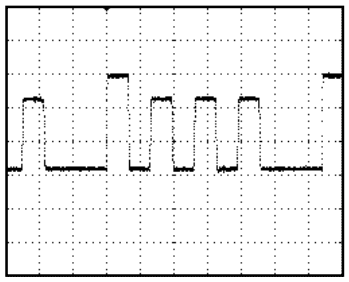
10 s
200mV

(33)



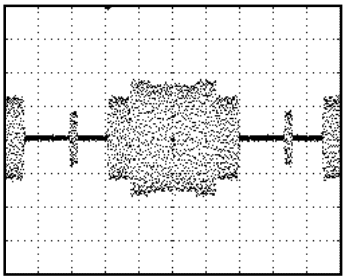
10 s
500mV

(38)



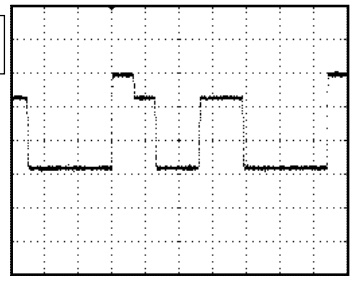
10 s
200mV

(34)



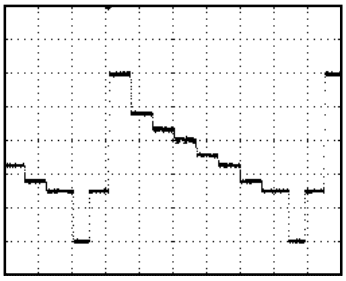
10 s
500mV

(39)



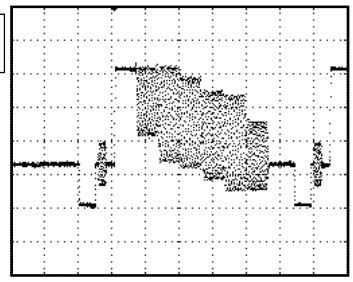
10 s
200mV

(35)



10 s
500mV

(40)

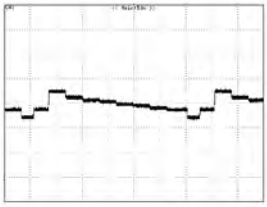


C SERVICE MAIN ASSY

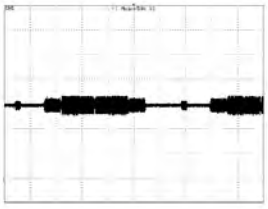
Measurement Condition :

No.1 - 8 : EBU Color Bar (100 / 0 / 75 / 0)

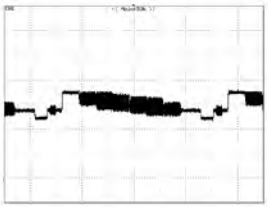
1 CN2301 Pin8 (Y_IN)
V: 1V/div. H: 10us/div.



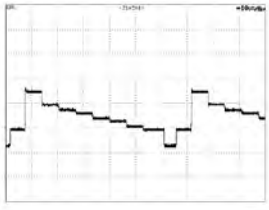
2 CN2301 Pin6 (C_IN)
V: 1V/div. H: 10us/div.



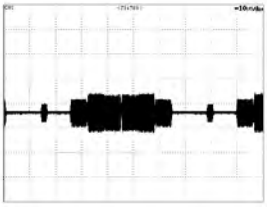
3 CN2301 Pin_8 (CVBS_IN)
V: 1V/div. H: 10us/div.



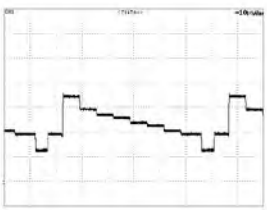
4 CN2301 Pin17 (Y_OUT)
V: 0.5V/div. H: 10us/div.



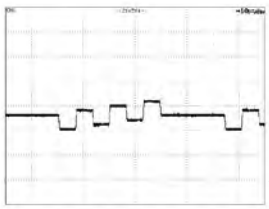
5 CN2301 Pin19 (C_OUT)
V: 0.5V/div. H: 10us/div.



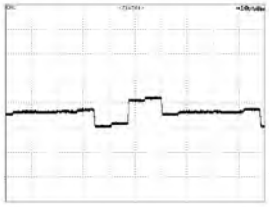
6 CN2301 Pin15 (YP_OUT)
V: 0.5V/div. H: 10us/div.



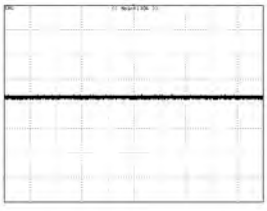
7 CN2301 Pin13 (CB_OUT)
V: 0.5V/div. H: 10us/div.



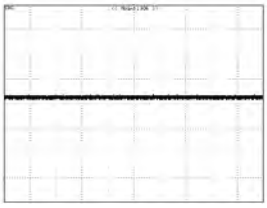
8 CN2301 Pin11 (CR_OUT)
V: 0.5V/div. H: 10us/div.



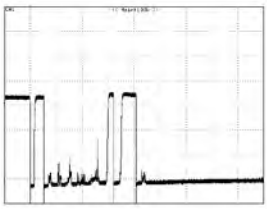
9 IC501 Pin22 (XDMUTE1)
V: 1V/div. H: 20us/div.



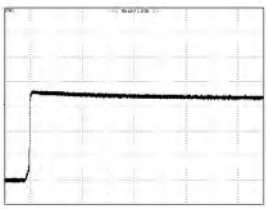
10 IC501 Pin23 (XDMUTE2)
V: 1V/div. H: 20us/div.



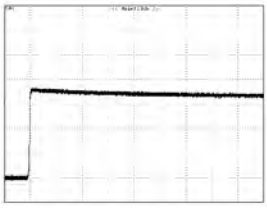
11 CN601 Pin3 (CLOSE)
open → close
V: 1V/div. H: 20us/div.



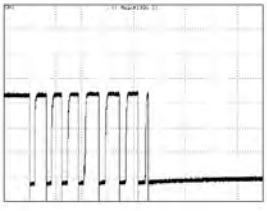
12 CN601 Pin3 (CLOSE)
close → open
V: 1V/div. H: 20us/div.



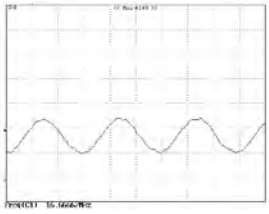
13 CN601 Pin5 (CLOSE)
open → close
V: 1V/div. H: 20us/div.



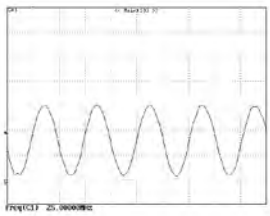
14 CN601 Pin5 (CLOSE)
close → open
V: 1V/div. H: 20us/div.



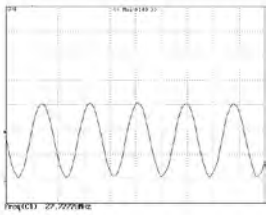
15 X201 (16.93MHz)
V: 1V/div. H: 20ns/div.



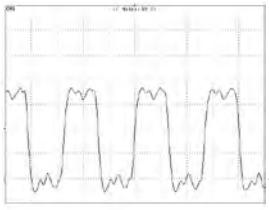
16 X1001 (24.576MHz)
V: 1V/div. H: 20ns/div.



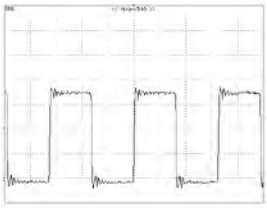
17 X1002 (27MHz)
V: 1V/div. H: 20ns/div.



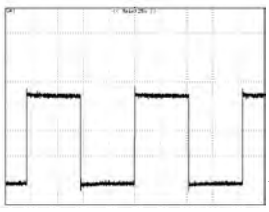
18 IC3101 Pin11 (ADCCLKO)
V: 1V/div. H: 20ns/div.



19 IC3101 Pin12 (AD_BCK)
V: 1V/div. H: 100ns/div.



20 IC3101 Pin10 (AD_LRCK)
V: 1V/div. H: 5us/div.



C SERVICE MAIN ASSY

A

B

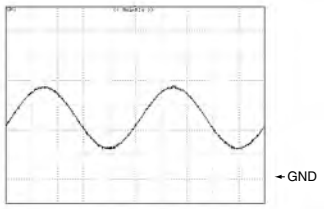
C

D

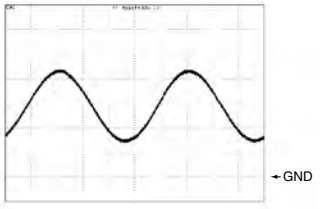
E

F

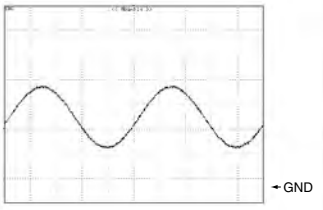
21 **CN2301 Pin4 (LCH IN)**
V: 1V/div. H: 200us/div.



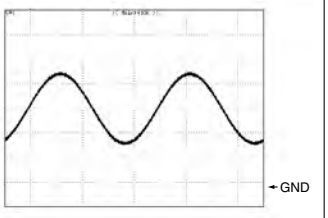
26 **CN2301 Pin21 (LCH OUT)**
V: 2V/div. H: 200us/div.



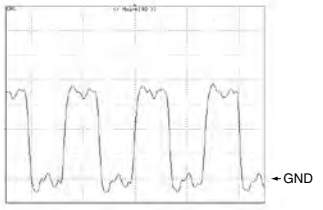
22 **CN2301 Pin2 (RCH IN)**
V: 1V/div. H: 200us/div.



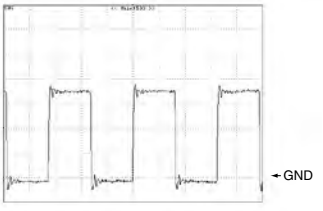
27 **CN2301 Pin23 (RCH OUT)**
V: 2V/div. H: 200us/div.



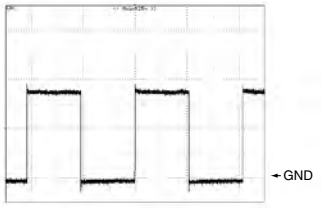
23 **IC3201 Pin16 (DACCLKO)**
V: 1V/div. H: 20ns/div.



24 **IC3201 Pin1 (DACBCKO)**
V: 1V/div. H: 100ns/div.



25 **IC3201 Pin3 (DACLRCKO)**
V: 0.5V/div. H: 5us/div.



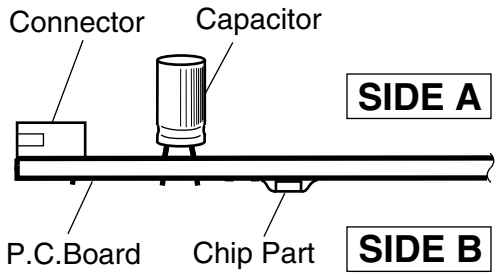
4. PCB CONNECTION DIAGRAM

NOTE FOR PCB DIAGRAMS :

1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

Symbol In PCB Diagrams	Symbol In Schematic Diagrams	Part Name
B C E	B C E B C E	Transistor
B C E	B C E B C E	Transistor with resistor
D G S	D G S D G S	Field effect transistor
		Resistor array
		3-terminal regulator

3. The parts mounted on this PCB include all necessary parts for several destinations.
   For further information for respective destinations, be sure to check with the schematic diagram.
4. View point of PCB diagrams.

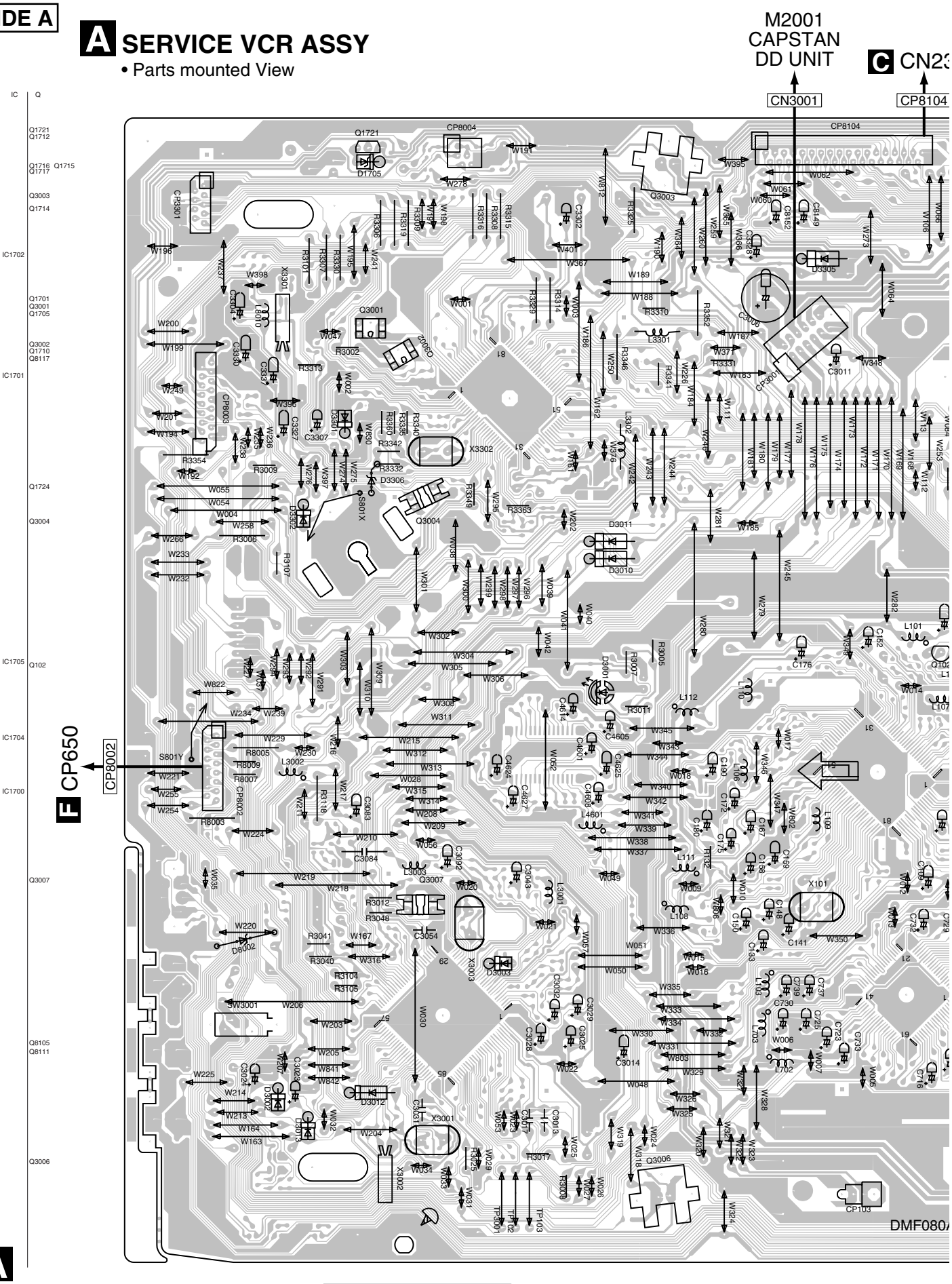


4.1 SERVICE VCR ASSY

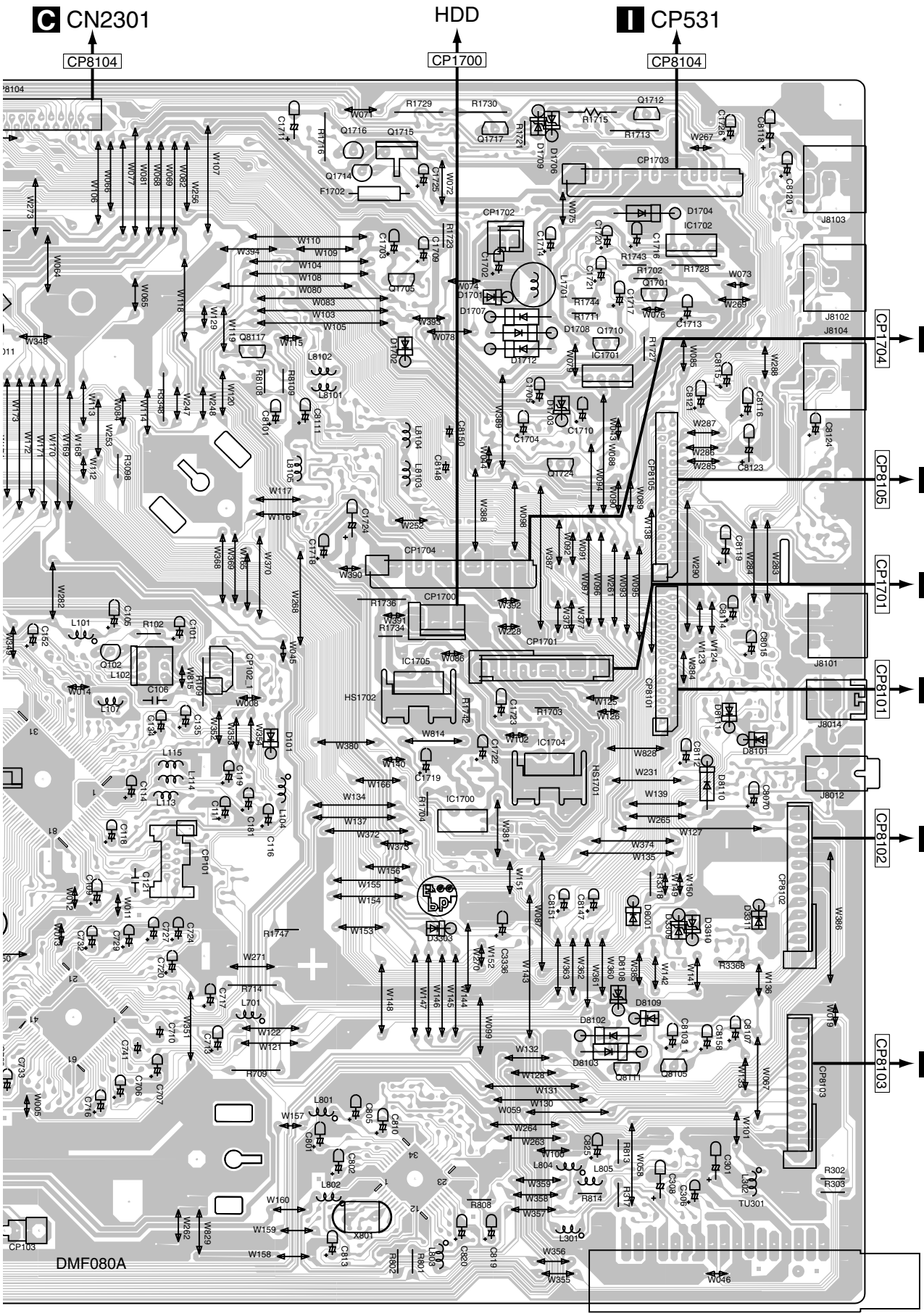
SIDE A

A SERVICE VCR ASSY

• Parts mounted View



SIDE A

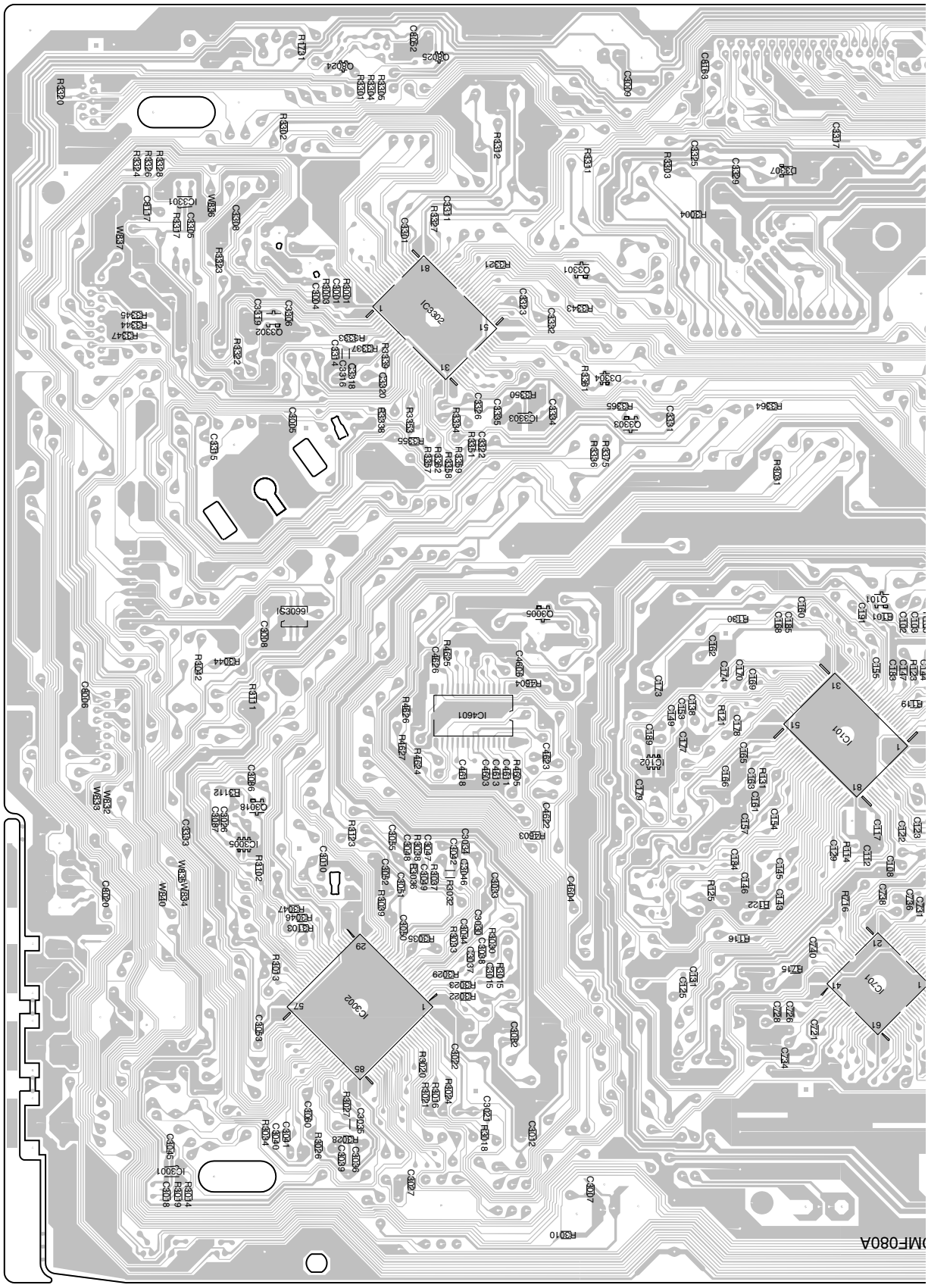

C CN2301
CP8104
HDD
CP1700
I CP531
CP8104
I CP530
CP1704
B CP8304
CP8105
C CN2401
CP1701
B CP8303
CP8101
B CP8301
CP8102
B CP8302
CP8103
DMF080A

SIDE A

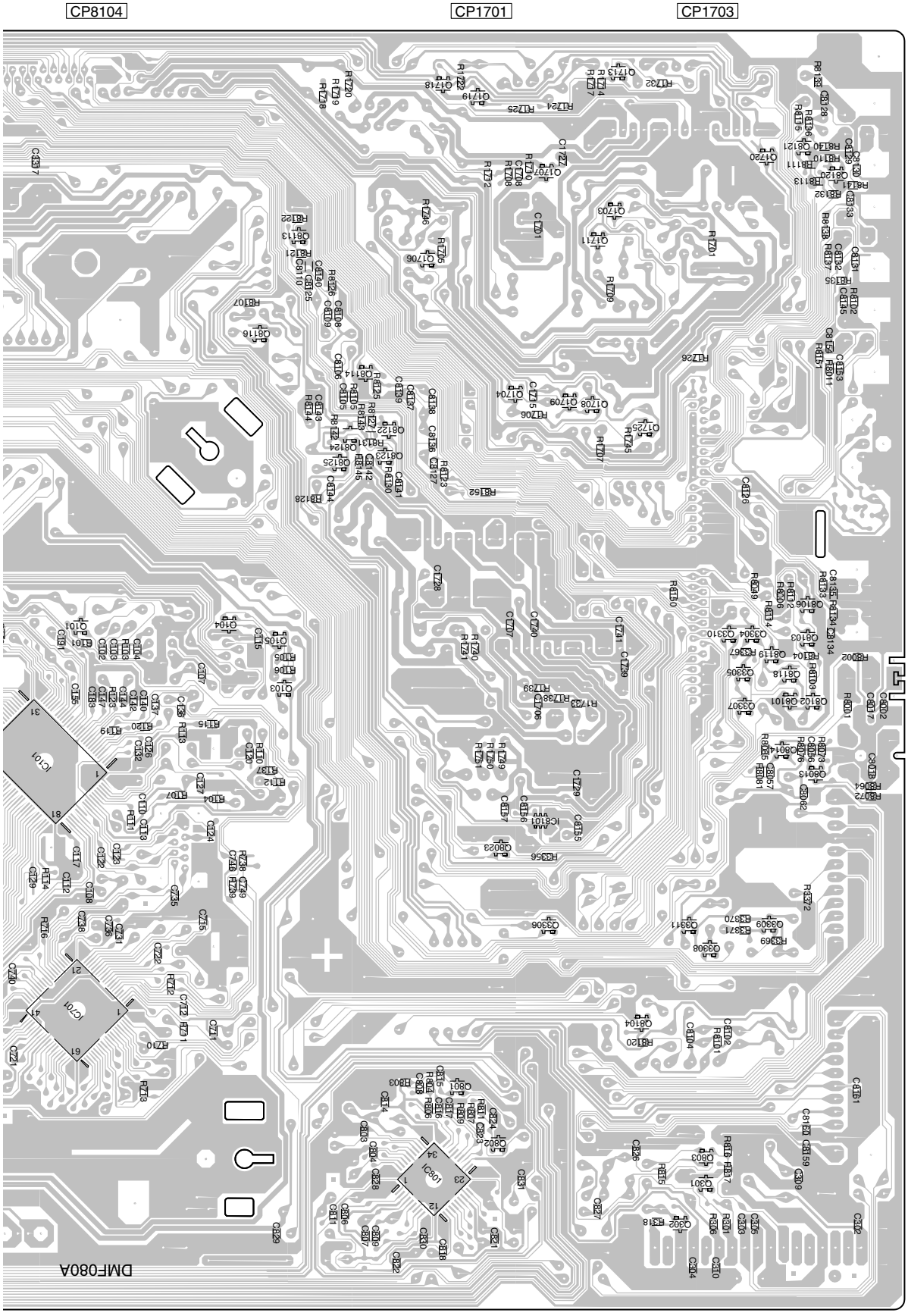
A SERVICE VCR ASSY

• Chip Parts mounted View

CP8104



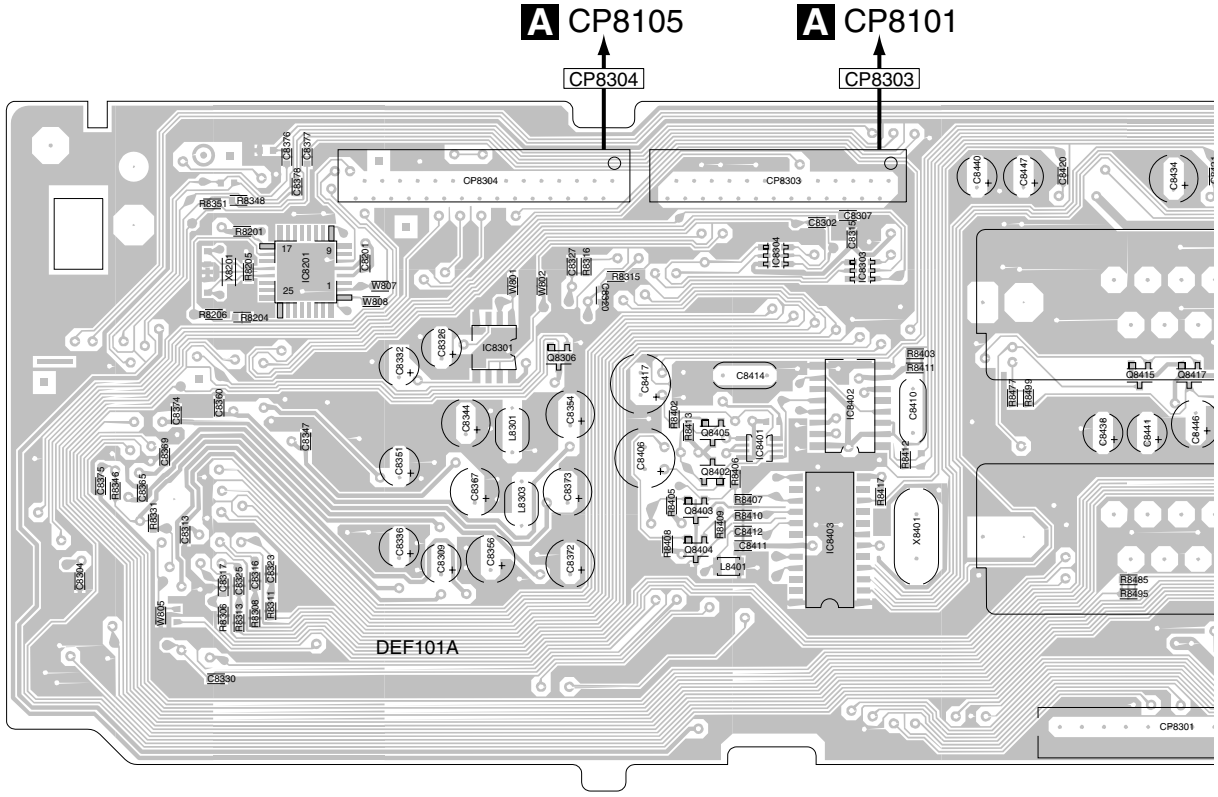
SIDE A



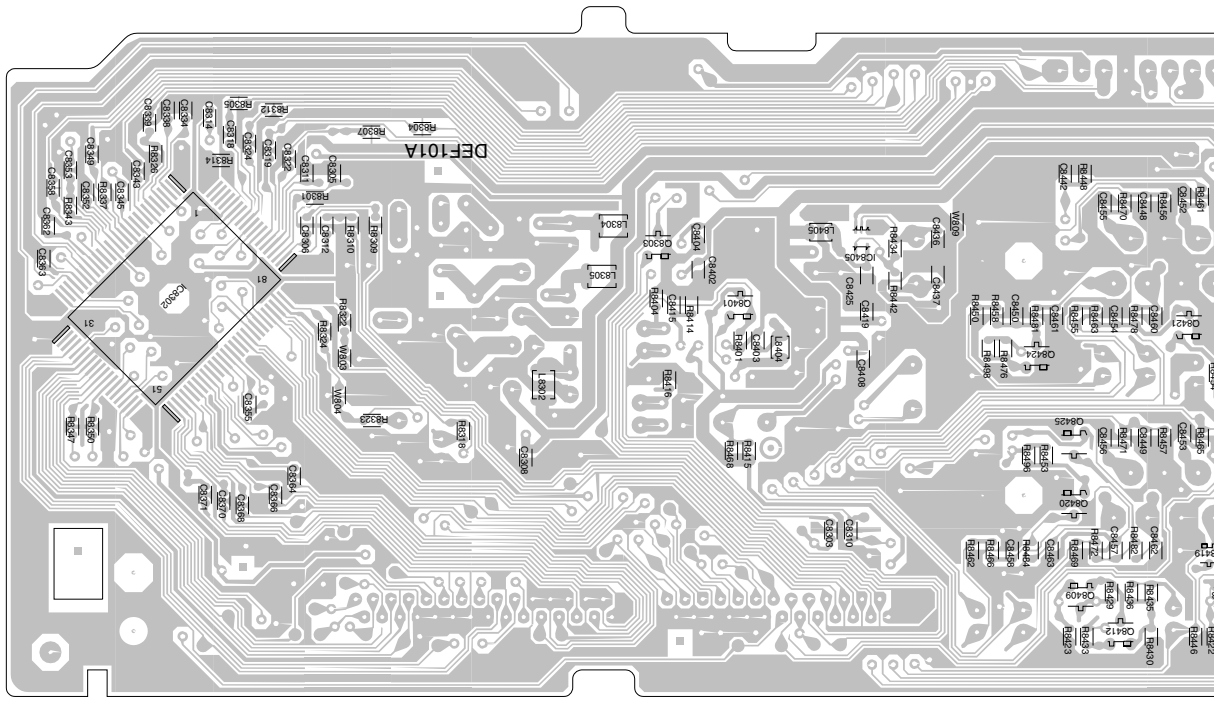
4.2 AV PCB, RELAY 1 and 2 PCB ASSYS

SIDE A

B AV PCB ASSY



SIDE B

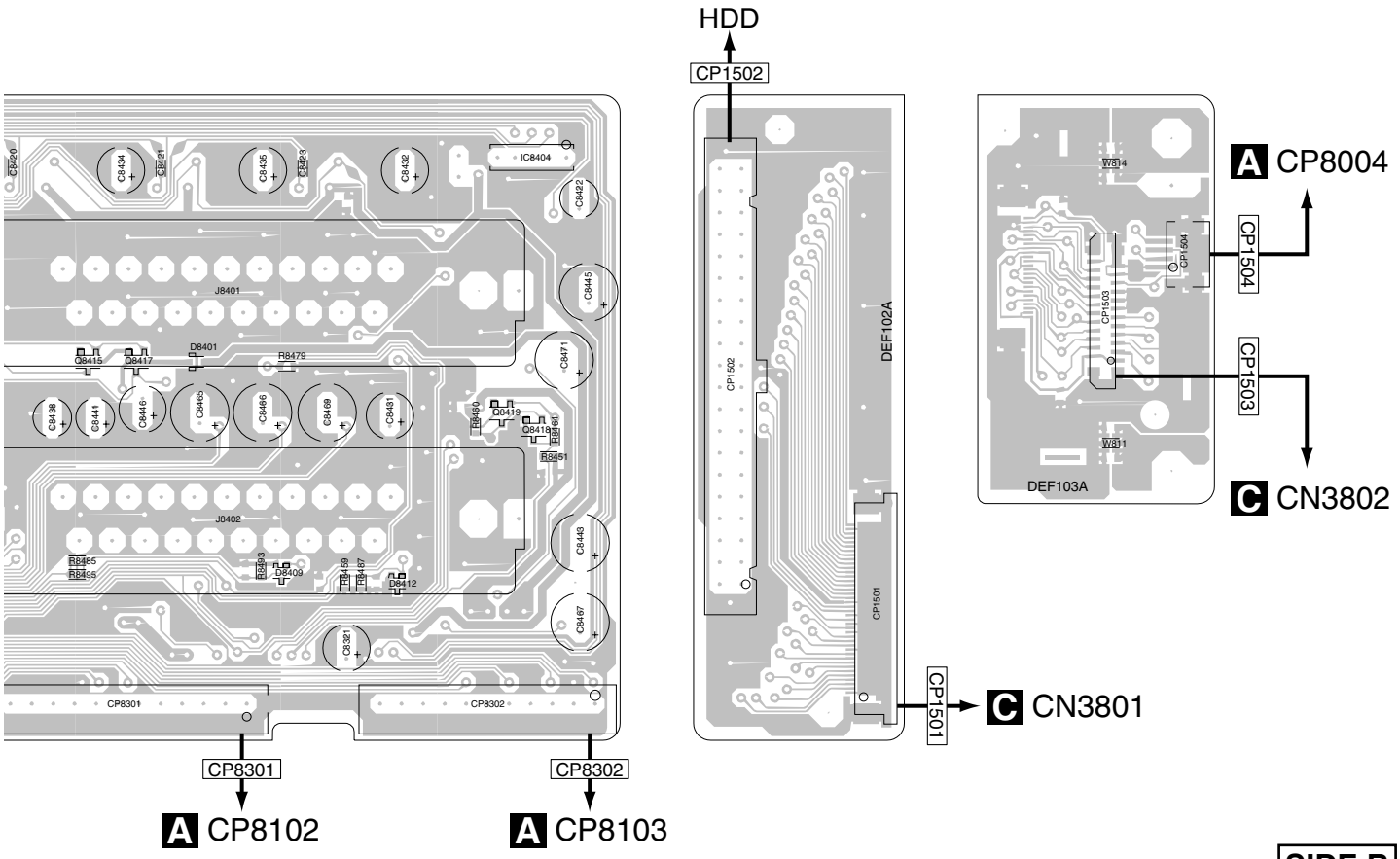


B

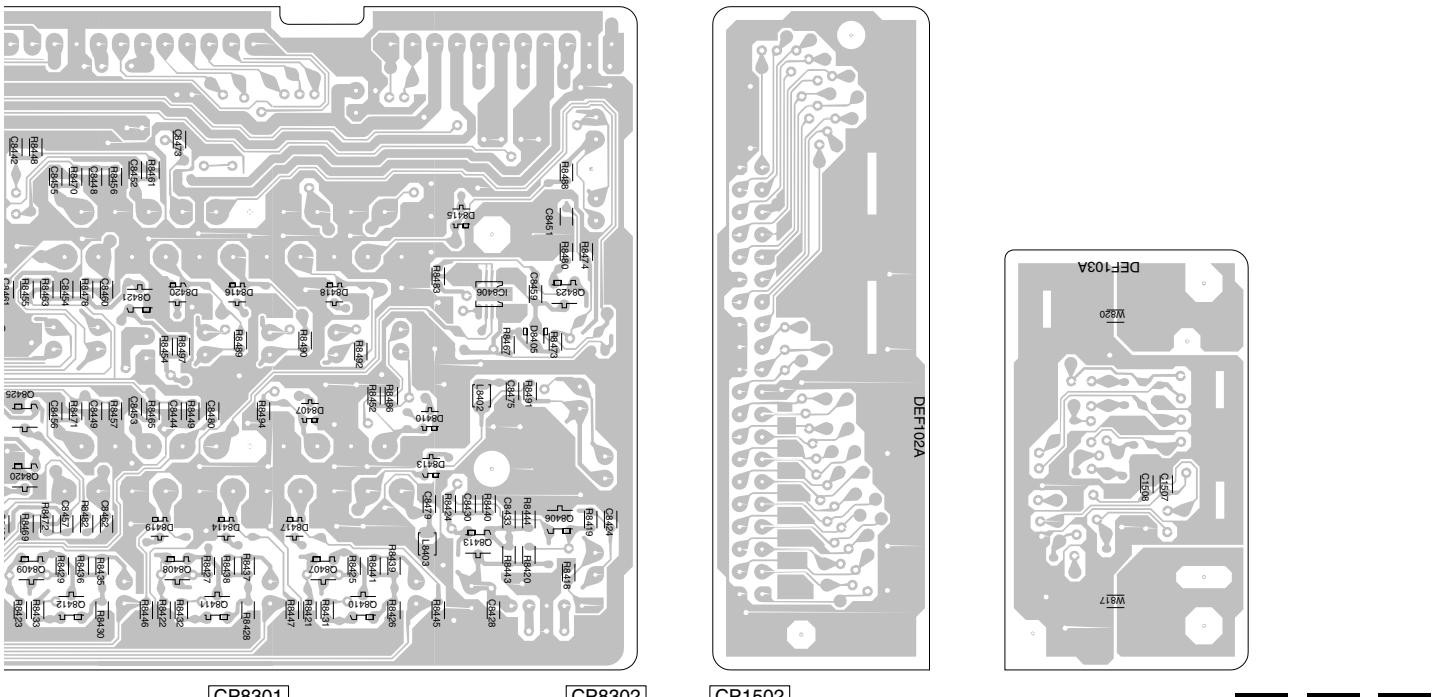
SIDE A

G RELAY1 PCB ASSY

H RELAY2 PCB ASSY



SIDE B

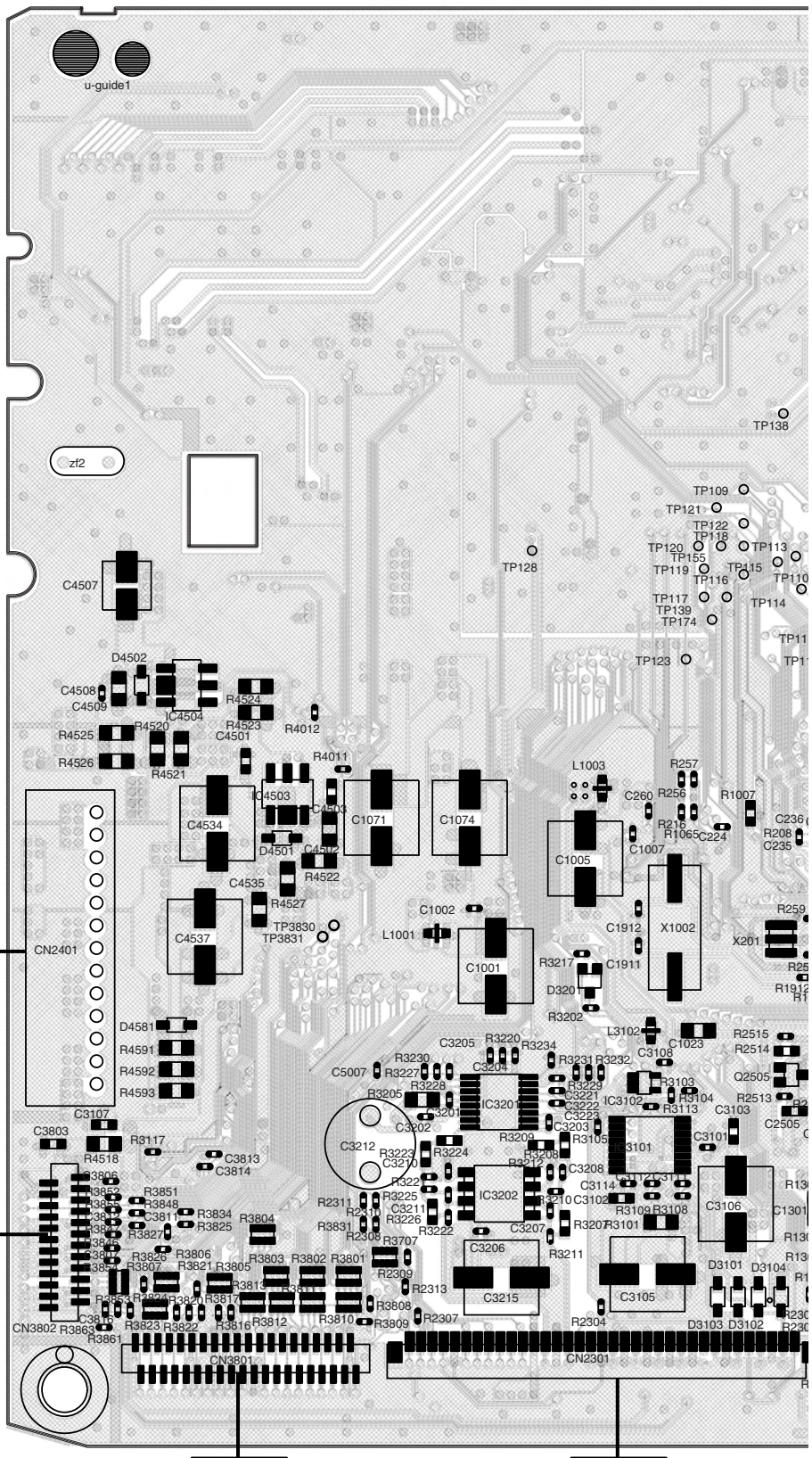


B G H

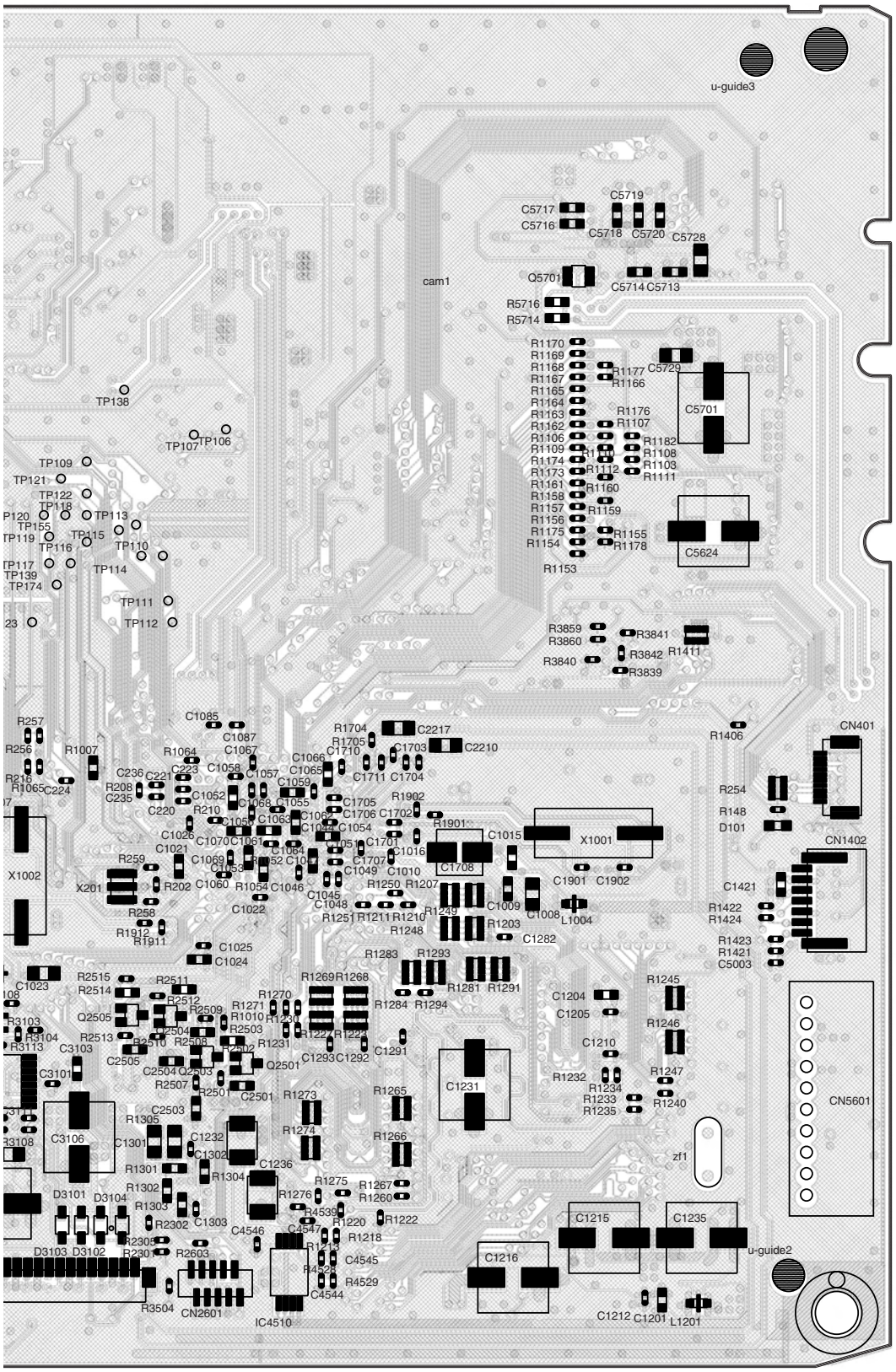
4.3 SERVICE MAIN ASSY

SIDE A

Q	IC
	IC4504
	IC3201
	IC3202



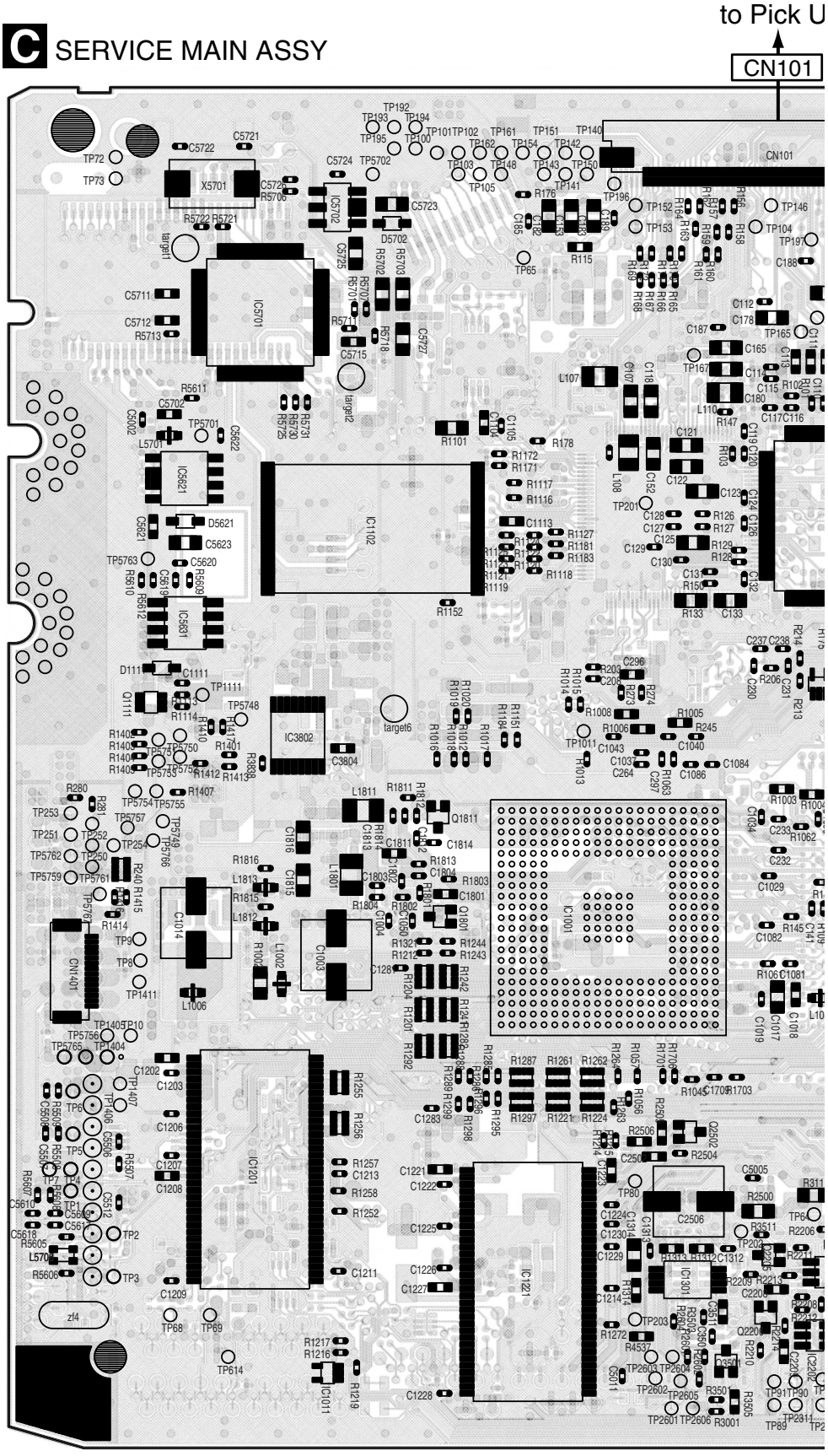
SIDE A



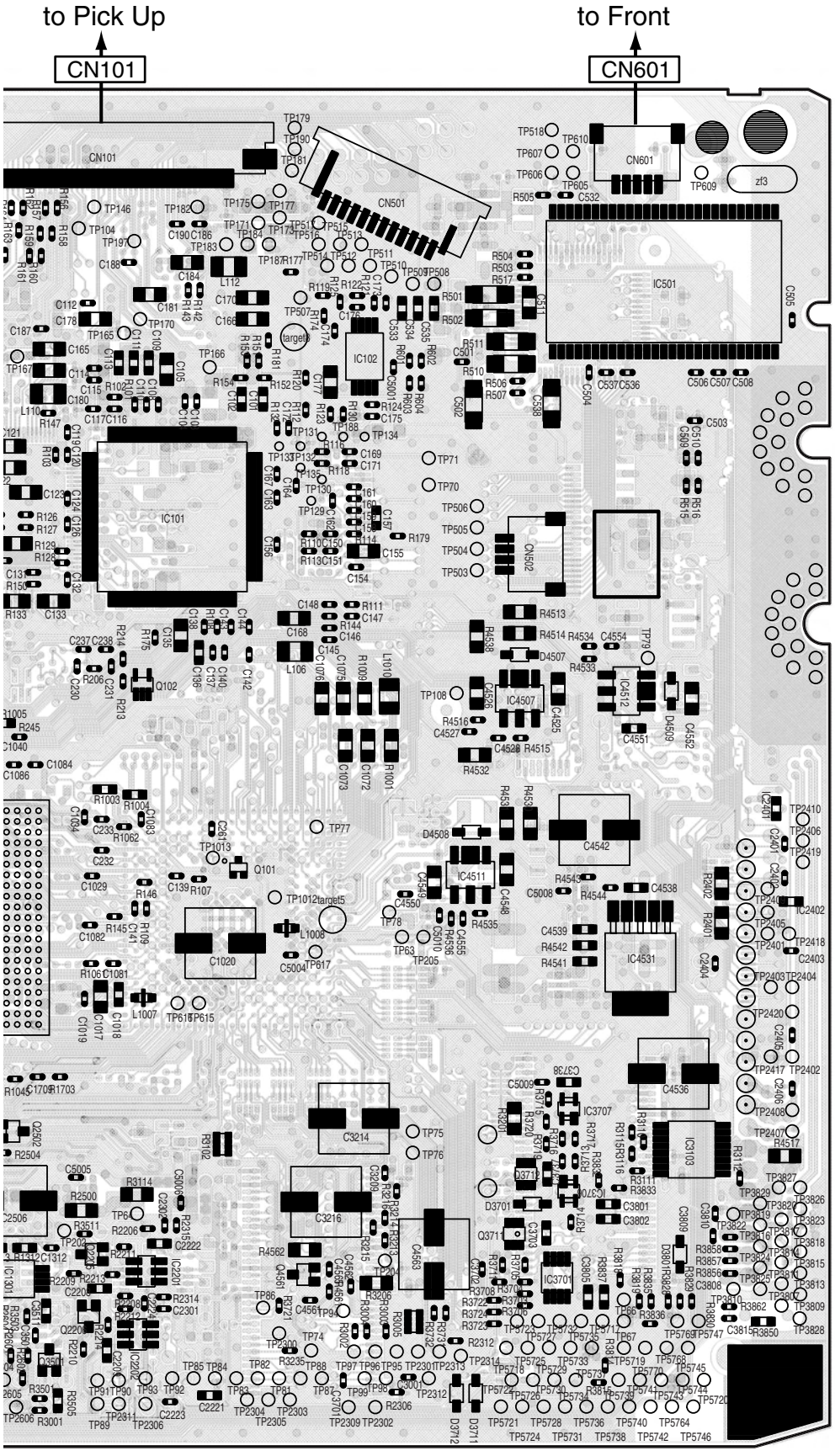
(VNP2038-A)

SIDE B

C SERVICE MAIN ASSY



SIDE B



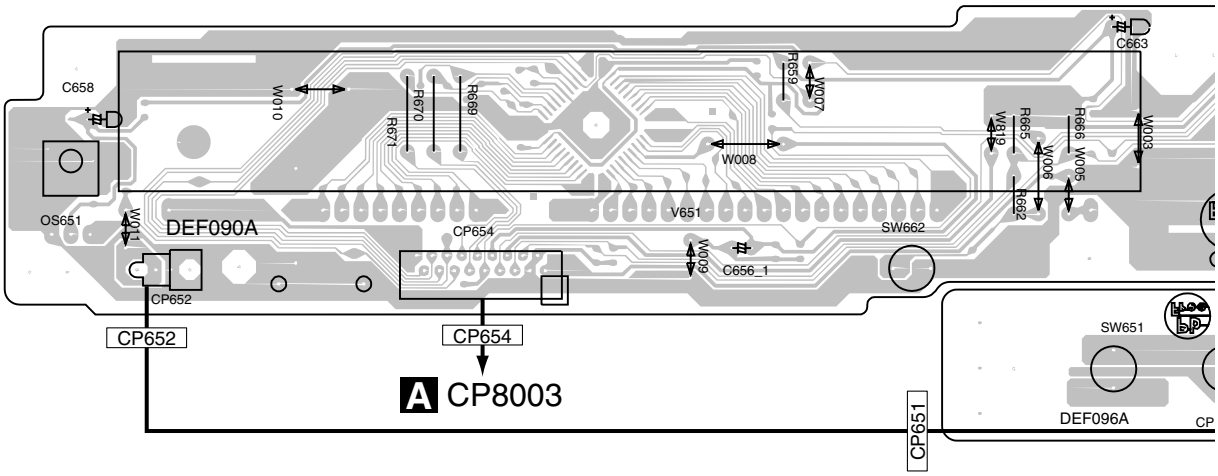
(VNP2038-B)

4.4 DISPLAY, OPERATION 1 and 2 PCB ASSYS

SIDE A

D DISPLAY PCB ASSY

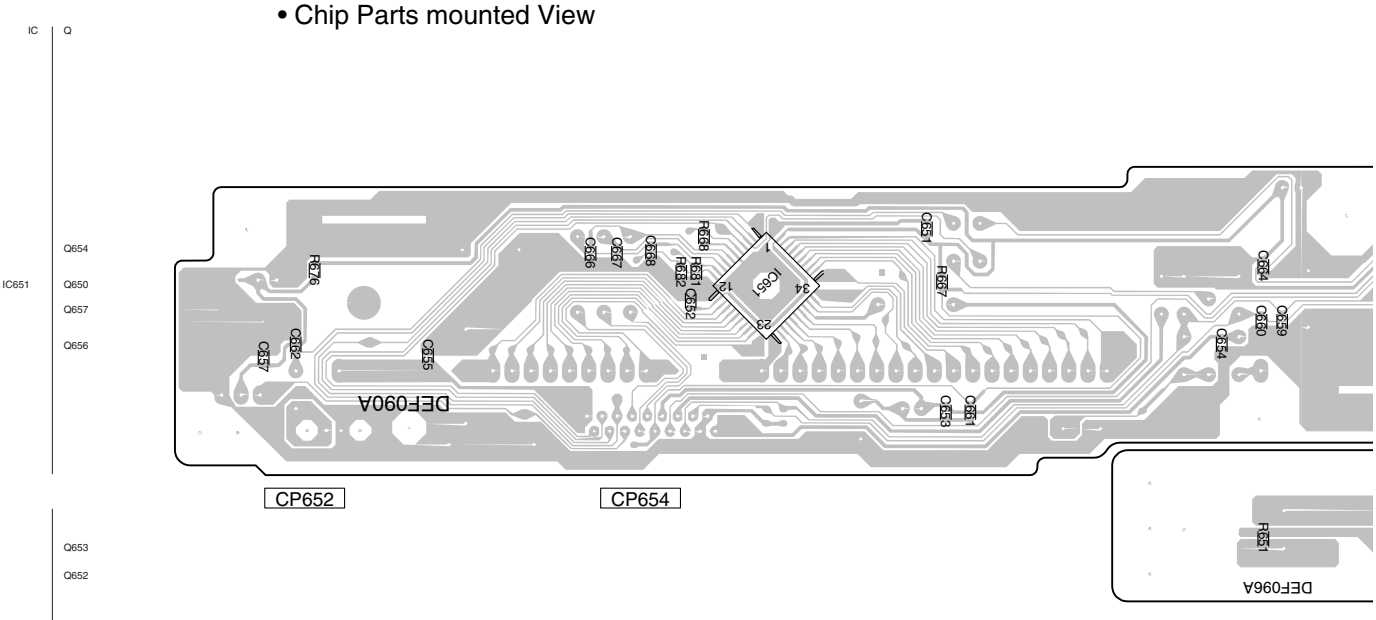
• Parts mounted View



E OPERATION PCB ASSY

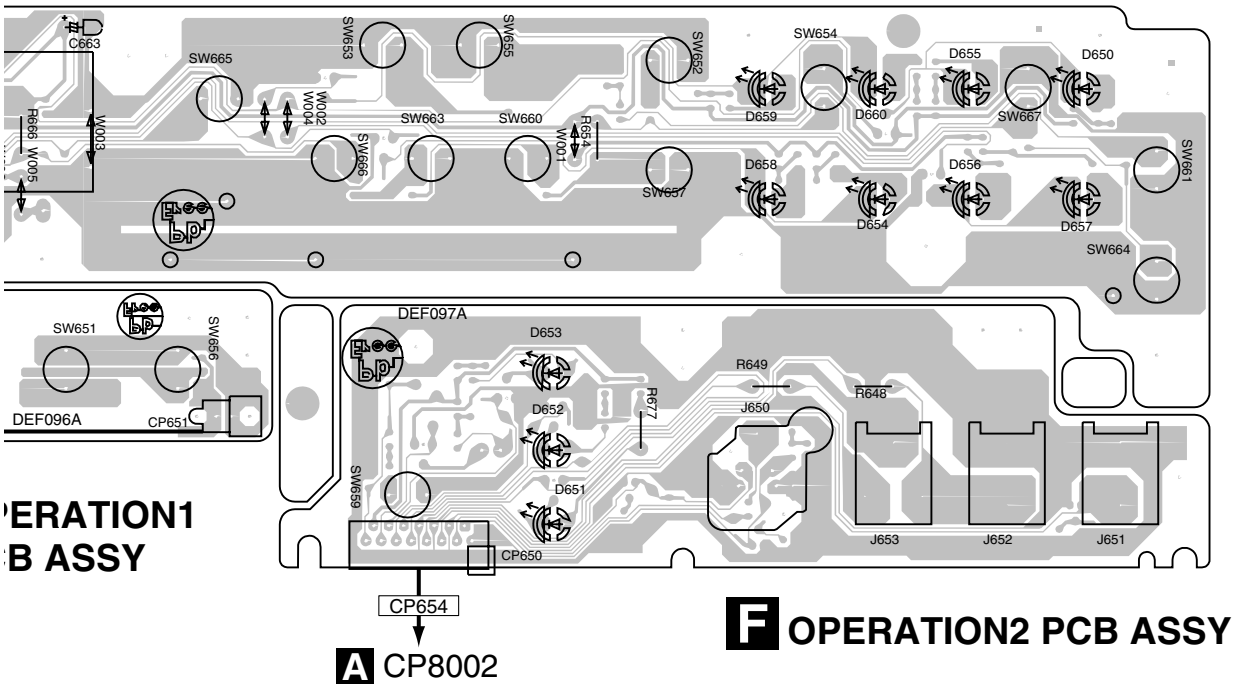
SIDE A

• Chip Parts mounted View

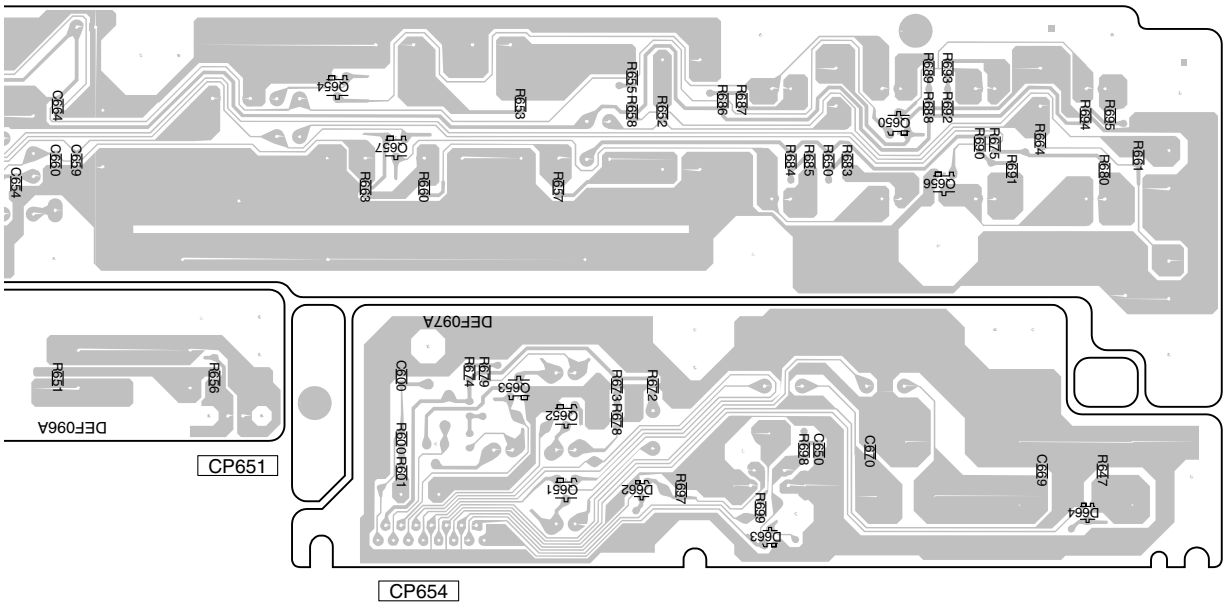


D E

SIDE A


C663
SW665
SW653
SW655
SW652
SW654
D655
D650
SW667
D659
D660
W002
W004
SW663
SW660
R654
W001
SW666
SW657
D658
D656
D654
D657
SW661
SW664
W003
R666
W005
SW651
SW656
DEF097A
D653
R649
R648
J650
R677
D652
DEF096A
CP651
D651
SW659
CP650
J653
J652
J651
CP654
A CP8002
F OPERATION2 PCB ASSY

SIDE A

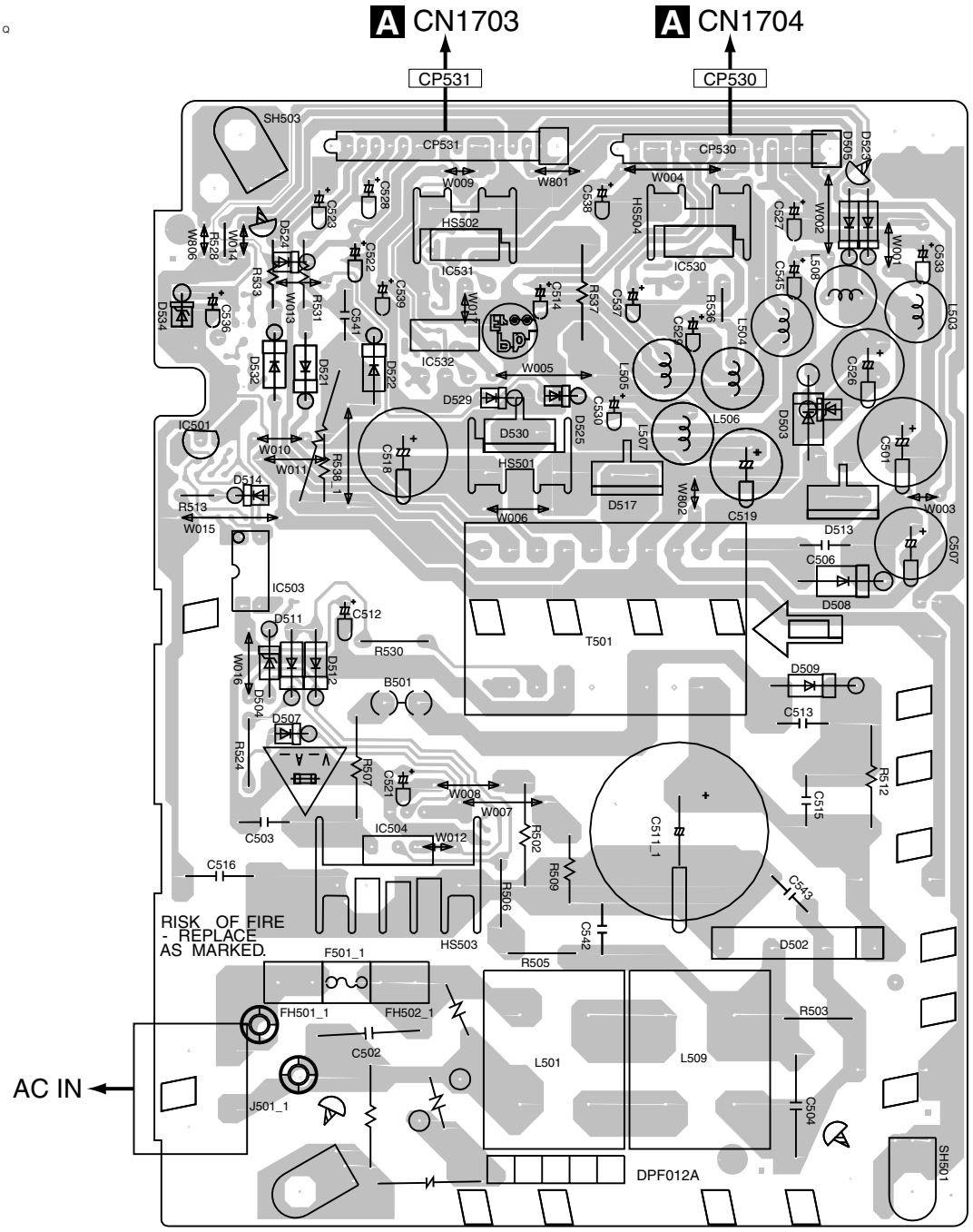

DEF097A
DEF096A
CP651
CP654

4.5 POWER PCB ASSY

SIDE A **SIDE A**

POWER PCB ASSY

• Parts mounted View

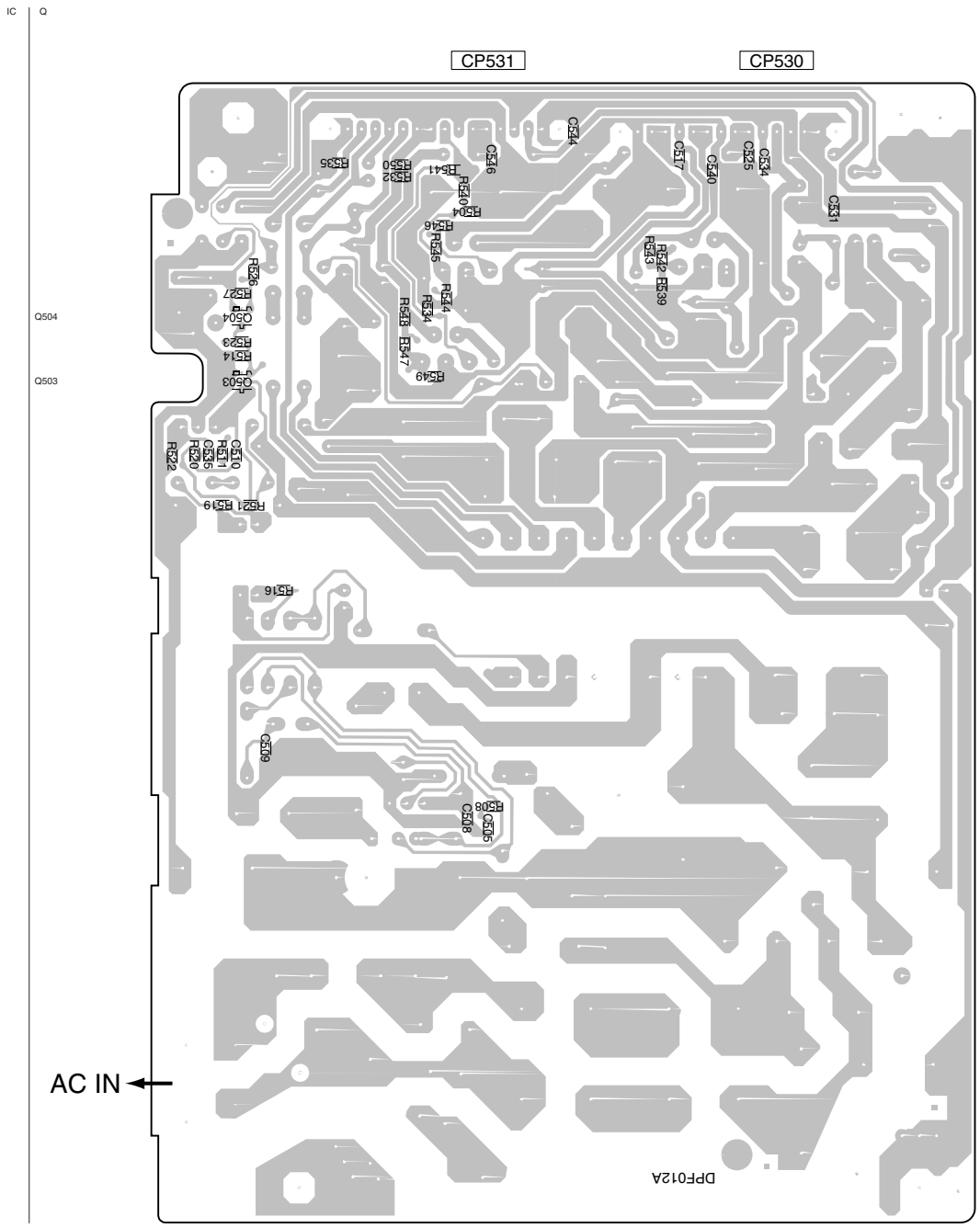


SIDE A

SIDE A

POWER PCB ASSY

- Chip Parts mounted View



5. PCB PARTS LIST

NOTES: ● *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
● *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
● *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω → 56 x 10[1] → 561 ..... RD1/4PU 5 6 1 J
47k Ω → 47 x 10[3] → 473 ..... RD1/4PU 4 7 3 J
0.5 Ω → R50 ..... RN2H R 5 0 K
1 Ω → 1R0 ..... RS1P 1 R 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 x 10[1] → 5621 ..... RN1/4PC 5 6 2 1 F

LIST OF ASSEMBLIES

Mark	No.	Description	Part No.
	1	SERVICE VCR ASSY	VXX3190
	1	AV PCB ASSY	A2J602AD20
	1	POWER PCB ASSY	A2J602A240
	1	OPERATION 1 PCB ASSY	A2J602A270
	1	OPERATION 2 PCB ASSY	A2J602A280
	1	DISPLAY PCB ASSY	A2J602ADP0
	1	RELAY 1 PCB ASSY	A2J602ADB0
	1	RELAY 2 PCB ASSY	A2J602ADC0
	1	SERVICE MAIN ASSY	VXX3161

SEMICONDUCTORS

Mark	No.	Description	Part No.
	IC101	IC HA118225F	I04F38225F
	IC102	IC MM1501XNRE	10UF015010
	IC651	IC PT6315	IF4K063150
	IC701	IC LA72646SM-MPB	I03F7646SM
	IC801	IC MSP3417G-QG-B8	I19FF34170
⚠	IC1700	IC BA7810T-V5	I07A078100
⚠	IC1701	IC PQ120RDA1SZH	I0GA9120R0
⚠	IC1702	IC PQ090RDA1SZH	I0GA9090R0
⚠	IC1704	IC BA7810T-V5	I07A078100
⚠	IC1705	IC BA7810T-V5	I07A078100
	IC3001	IC PST3231NR	I9UF032310
	IC3002	IC OEC0163A	I54F50163A
	IC3005	IC MM1501XNRE	I0UF015010
	IC3099	IC AT24C08AN-10SU-2.7	S2J602AE01
	IC3301	IC BD4846G-TR	I57J048460
	IC3302	IC LC87F05J2A(PMC010A8)	I53F0C010A
	IC3303	IC BU4220G-TR	I57J04220G
	IC4601	IC LA70100M-MPB	I03F00100M
	IC8101	IC MM1503XNRE	I0UF015030
	IC8201	IC SP543045CFJE	IFXK0RD320
	IC8301	IC NJM2068M(TE1)	I0QF020680
	IC8302	IC HA118326APF-E	I04F38326P
	IC8303	IC MM1507XNRE	I0UF015070
	IC8304	IC MM1507XNRE	I0UF015070
	IC8401	IC TC4W53FU	I55F04W53U
	IC8402	IC TC74HC123AF	I55FHC123A
	IC8403	IC BH7236AF-E2	I07F072360
	IC8404	IC LA7213-E	I03S07213E
	IC8405	IC TC7SU04FU	I55F0U04FU
	IC8406	IC TC7W53FU	I55F07W53U
	Q101	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
	Q102	TRANSISTOR,SILICON KTC3203	TCAT032034
	Q103	COMPOUND TRANSISTOR KRA103SRTK	TPAAC05002
	Q104	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
	Q105	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
	Q301	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
	Q302	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
	Q650	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q651	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q652	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q653	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q654	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q656	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q657	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q801	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
	Q802	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
	Q803	TRANSISTOR,SILICON 2SC2814	T83A02814E
⚠	Q1701	TRANSISTOR,SILICON KTA1281	TAAT01281Y
	Q1703	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q1704	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
⚠	Q1705	TRANSISTOR,SILICON KTA1281	TAAT01281Y
	Q1706	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q1707	TRANSISTOR,SILICON 2SD2114KT146	T97A021140
	Q1708	COMPOUND TRANSISTOR KRA104SRTK	TPAAD05003
	Q1709	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
⚠	Q1710	TRANSISTOR,SILICON KTA1281	TAAT1281Y
	Q1711	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q1712	TRANSISTOR,SILICON KTC3209	TCAT03209Y
	Q1713	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
	Q1714	TRANSISTOR,SILICON KTC3198	TCATC31980
	Q1715	TRANSISTOR,SILICON KTB151	TBA0011510
	Q1716	TRANSISTOR,SILICON KTC3198	TCATC31980
	Q1717	TRANSISTOR,SILICON KTA1281	TAAT01281Y
	Q1718	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
	Q1719	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
	Q1720	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
	Q1721	TRANSISTOR,SILICON KTC3209	TCAT03209Y
⚠	Q1724	TRANSISTOR,SILICON KTA1281	TAAT01281Y
	Q1725	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
	Q3001	PHOTO COUPLER RPI-352C40N	0002700680
	Q3002	PHOTO COUPLER RPI-352C40N	0002700680
	Q3003	PHOTO TRANSISTOR ST-304L	0000M00390
	Q3004	PHOTO COUPLER RPI-303	0002700690
	Q3005	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
	Q3006	PHOTO TRANSISTOR ST304L	000M00390
	Q3007	PHOTO COUPLER RPI-303	0002700690
	Q3018	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
	Q3301	COMPOUND TRANSISTOR KRC111SRTK	TNAAJ05003
	Q3302	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002

Mark No.	Description	Part No.
Q3303	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q3304	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q3305	COMPOUND TRANSISTOR KRA111S	TPAAJ05001
Q3306	COMPOUND TRANSISTOR KRC103SRTK	TPAAC05002
Q3307	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q3308	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q3309	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
Q3310	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q3311	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q8013	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
Q8014	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8023	COMPOUND TRANSISTOR KRA111S	TPAAJ05001
Q8024	FET KTK5132E	T2AA5132E0
Q8025	FET KTK5132E	T2AA5132E0
Q8101	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q8102	COMPOUND TRANSISTOR KRA103SRTK	TPAAC05002
Q8103	TRANSISTOR,SILICON 2SD2114KT	T97A021140
Q8104	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q8105	TRANSISTOR,SILICON KTC3209	TCAT03209Y
Q8106	TRANSISTOR,SILICON 2SD2114KT	T97A021140
Q8111	TRANSISTOR,SILICON KTA1281	TAAT01281Y
Q8113	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
Q8114	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
Q8116	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q8117	TRANSISTOR,SILICON KTA1281S	TAAT01281Y
Q8118	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q8119	COMPOUND TRANSISTOR KRA103SRTK	TPAAC05002
Q8120	TRANSISTOR,SILICON 2SD2114KT146	T97A021140
Q8121	TRANSISTOR,SILICON 2SD2114KT146	T97A021140
Q8122	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8123	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8124	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8125	COMPOUND TRANSISTOR KRA101SRTK	TPAAA05001
Q8303	COMPOUND TRANSISTOR KRC103SRTK	TNAAC05002
Q8306	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8401	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8402	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8403	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
Q8404	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
Q8405	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8406	TRANSISTOR,SILICON KTA1504S	TAAA1504SY
Q8407	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8408	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8409	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8410	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8411	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8412	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8413	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8415	COMPOUND TRANSISTOR KRA103SRTK	TPAAC05002
Q8417	COMPOUND TRANSISTOR KRA103SRTK	TPAAC05002
Q8418	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8419	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8420	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8421	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8423	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8424	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
Q8425	TRANSISTOR,SILICON KTC3875S	TCAA3875SY
D101	DIODE,SILICON 1SS133T-77	D1VT001330
D650	LED, LTL-1CHEE-002A	0021E2Q140
D651	LED, LTL-1CHAE-002A	0021E3Q030
D652	LED, SLR-343BBTT32	0021761010
D653	LED, LTL-1CHGE-002A	0021E5Q210
D654	LED, LTL-1CHAE-002A	0021E3Q030
D655	LED, LTL-1CHEE-002A	0021E2Q140
D656	LED, LTL-1CHEE-002A	0021E2Q140
D657	LED, LTL-1CHEE-002A	0021E2Q140
D658	LED, LTL-1CHAE-002A	0021E3Q030
D659	LED, LTL-1CHAE-002A	0021E3Q030
D660	LED, LTL-1CHAE-002A	0021E3Q030
D662	DIODE,ZENER DF3A5.6FU	DE5RD5R610
D663	DIODE,ZENER DF3A5.6FU	DE5RD5R610
D664	DIODE,ZENER DF3A5.6FU	DE5RD5R610
D1701	DIODE,SILICON 1SS133T-77	D1VT001330
D1702	DIODE,SILICON 1SS133T-77	D1VT001330
D1703	DIODE,ZENER MTZJ33B T-77	D97U03301B
D1704	DIODE,SILICON 1N4005-EIC	D2WXN40050
D1705	DIODE,ZENER MTZJ5.6B T-77	D97U05R61B
D1706	DIODE,ZENER MTZJ30B-EIC	D9WU03002B
D1707	DIODE,SILICON 1N4005-EIC	D2WXN40050
D1708	DIODE,SILICON IN4005-EIC	D2WXN40050
D1709	DIODE,ZENER MTZJ2.7B-EIC	D9WU02R72B
D1712	DIODE,SILICON 1N4005-EIC	D2WXN40050
D3001	INFRARED LED LTE-3271T-012A	0010E00330
D3002	DIODE,SILICON 1SS133T-77	D1VT001330
D3003	DIODE,SILICON 1SS133T-77	D1VT001330
D3010	DIODE,SCHOTTKY 11EQS04N	D28XQS04N0
D3011	DIODE,SCHOTTKY 11EQS04N	D28XQS04N0
D3012	DIODE,SILICON 1SS133T-77	D1VT001330
D3013	DIODE,SILICON 1SS133T-77	D1VT001330
D3301	DIODE,SILICON 1SS133T-77	D1VT001330
D3302	DIODE,SILICON 1SS133T-77	D1VT001330
D3303	DIODE,SILICON 1SS133T-77	D1VT001330
D3304	DIODE,SILICON KDS120RTK	DDARDS1200
D3305	DIODE,SCHOTTKY 11EQS04N	D28XQS04N0
D3306	DIODE,ZENER MTZJ6.8B T-77	D97U06R81B
D3307	DIODE,SCHOTTKY BARRIER	DD7R60M400
D3309	DIODE,ZENER MTZJ5.1B T-77	D97U05R11B
D3310	DIODE,ZENER MTZJ5.1B T-77	D97U05R11B
D3311	DIODE,SILICON 1SS133T-77	D1VT001330
D8001	DIODE,SILICON 1SS133T-77	D1VT001330
D8002	DIODE,ZENER MTZJ6.8B T-77	D97U06R81B
D8101	DIODE,SILICON 1SS133T-77	D1VT001330
D8102	DIODE,SILICON 1N4005-EIC	D2WXN40050
D8103	DIODE,SILICON 1N4005-EIC	D2WXN40050
D8108	DIODE,ZENER MTZJ9.1B T-77	D97U09R11B
D8109	DIODE,SILICON 1SS133T-77	D1VT001330
D8110	DIODE,SILICON 1SS133T-77	D1VT001330
D8111	DIODE,SILICON 1SS133T-77	D1VT001330
D8401	DIODE,SILICON 1SS355 TE-17	DD7R0S3550
D8405	DIODE,SILICON 1SS355 TE-17	DD7R0S3550
D8407	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8409	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8410	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8412	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8413	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8414	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8415	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8416	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8417	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8418	DIODE, ZENER DF3A5.6FU	DE5RD5R610

Mark No.	Description	Part No.
D8419	DIODE, ZENER DF3A5.6FU	DE5RD5R610
D8420	DIODE, ZENER DF3A5.6FU	DE5RD5R610

SWITCHES

SW651	SWITCH,TACT EVQ11L05R	0504R01T38
SW652	SWITCH,TACT EVQ11L05R	0504R01T38
SW653	SWITCH,TACT EVQ11L05R	0504R01T38
SW654	SWITCH,TACT EVQ11L05R	0504R01T38
SW655	SWITCH,TACT EVQ11L05R	0504R01T38
SW656	SWITCH,TACT EVQ11L05R	0504R01T38
SW657	SWITCH,TACT EVQ11L05R	0504R01T38
SW659	SWITCH,TACT EVQ11L05R	0504R01T38
SW660	SWITCH,TACT EVQ11L05R	0504R01T38
SW661	SWITCH,TACT EVQ11L05R	0504R01T38
SW662	SWITCH,TACT EVQ11L05R	0504R01T38
SW663	SWITCH,TACT EVQ11L05R	0504R01T38
SW664	SWITCH,TACT EVQ11L05R	0504R01T38
SW665	SWITCH,TACT EVQ11L05R	0504R01T38
SW666	SWITCH,TACT EVQ11L05R	0504R01T38
SW667	SWITCH,TACT EVQ11L05R	0504R01T38
SW3001	SWITCH (LEAF) LSA-1144EAU	0508S11001

COILS

L101	COIL 100 UH	02167F101J
L102	COIL,BIAS OSC 1626011	031626011R
L103	COIL 100 UH	02167F101J
L104	COIL 100 UH	02167F101J
L106	COIL 47 UH	021LA6470J
L107	COIL 82 UH	021LA6820K
L108	COIL 22 UH	02167F220J
L109	COIL 12 UH	021LA6120J
L110	COIL 39 UH	021LA6390J
L111	COIL 100 UH	02167F101J
L112	COIL 22 UH	02167F220J
L113	COIL 1 UH	021LA61R0M
L114	COIL 1 UH	021LA61R0M
L115	COIL 1 UH	021LA61R0M
L301	COIL 22 UH	021LA6220J
L302	COIL 22 UH	021673220K
L701	COIL 22 UH	02167F220J
L702	COIL 22 UH	02167F220J
L703	COIL 22 UH	02167F220J
L801	COIL 22 UH	02167F220J
L802	COIL 22 UH	02167F220J
L803	COIL 22 UH	02167F220J
L804	COIL 100 UH	02167F101J
L805	COIL 10 UH	021LA6100J
L1701	COIL 1 MH	02167E102K
L3001	COIL 8.2 UH	0216A68R2J
L3002	COIL 22 UH	02167F220J
L3003	COIL 27 UH	021LA6270J
L4601	COIL 22 UH	02167F220J
L8010	COIL 22 UH	021LA6220J
L8101	COIL 15 UH	021LA6150J
L8102	COIL 18 UH	021LA6180J
L8104	COIL 18 UH	021LA6180J
L8105	COIL 47 UH	021LA6470J
L8301	COIL 100 UH	02167F101J
L8302	COIL 22 UH	0216S8220K
L8303	COIL 100 UH	02167F101J
L8401	COIL 68 UH	0216SD680J
L8402	COIL 1 UH	0216SD1R0J
L8403	COIL 10 UH	0216SD100J
L8404	COIL 3.9 UH	0216SD3R9J
L8405	COIL 22 UH	0216SD220J

RESISTORS

⚠ R509	R,FUSE 100 OHM 1/4W	R65584101J
⚠ R531	R,FUSE 68 OHM 1/4W	R65584680J
⚠ R533	R,FUSE 2.7 OHM 1/4W	R655842R7J
R1713	RC 560 OHM 1/2W	R002T2561J
R1729	RC 47 OHM 1/2W	R002T2470J
R1730	RC 47 OHM 1/2W	R002T2470J

OTHERS

J650	PLUG DIN-417HA-01	062R750007
J651	RCA JACK AV1-06AD-3	060Q401108
J652	RCA JACK AV1-06AD-4	060Q401109
J653	RCA JACK AV1-06ADS-2	060Q421048
J8012	RCA JACK MSJ-1637AG(O87)	060J100001
J8014	JACK,RCA,3.5 MSJ-035-12A	060J121014
J8101	JACK DIN-409A	063R700013
J8102	RCA JACK RCA-332-00-04	060R411048
J8103	RCA JACK RCA-332-00-02	060R411046
J8104	RCA JACK RCA-332-00-03	060R411047
J8401	SOCKET,21PIN MRC-021H-02PC	063D100067
J8402	SOCKET,21PIN MRC-021H-02PC	063D100067
CD103	FLAT CABLE AWM2468 A WG26 2C BLACK 120MM	W9L6012042
CD530	FLAT CABLE AWM2468 A WG26 15C GRAY 220MM	WML6022038
CD531	FLAT CABLE AWM2468 A WG26 15C GRAY 160MM	WNL6816038
CD652	FLAT CABLE AWM2468 A WG26 2C BLACK 180MM	W9L6018038
CP101	CONNECTOR PCB SIDE TOC-C09X-A1	0697290620
CP102	CONNECTOR PCB SIDE IMSA-9604S-04C	069J740599
CP103	WIRE HOLDER B2013H02-2P	067U002019
CP530	WIRE HOLDER B2013H02-14P	067U014019
CP531	WIRE HOLDER B2013H02-15P	067U015019
CP650	CONNECTOR PCB SIDE IMSA-9615S-15C	069JVF0200
CP651	WIRE HOLDER B2013H02-2P	067U002019
CP652	WIRE HOLDER B2013H02-2P	067U002019
CP654	CONNECTOR PCB SIDE	069JVI0200
CP1501	CONNECTOR PCB SIDE IMSA-9632S	06AJY0402F
CP1502	CONNECTOR PCB SIDE IMSA-9353S	06AJ604060
CP1503	CONNECTOR PCB SIDE IMSA-9639S	069JYOT01F
CP1504	CONNECTOR PCB SIDE 04_6232_104	069EV4T070
CP1700	CONNECTOR PCB SIDE A2544WV2-4P	069V140339
CP1701	CONNECTOR PCB SIDE	069X2D0719
CP1702	CONNECTOR PCB SIDE	069S220629
CP1703	CONNECTOR PCB SIDE	069R2F0589
CP1704	CONNECTOR PCB SIDE	069R2E0589
CP3001	CONNECTOR PCB SIDE	06972C0010
CP3301	CONNECTOR PCB SIDE	069EV93030
CP8002	CONNECTOR PCB SIDE	069EVF3030
CP8003	CONNECTOR PCB SIDE	069EVI3030
CP8004	CONNECTOR PCB SIDE	069JV40200
CP8101	CONNECTOR PCB SIDE	069V140339
CP8102	CONNECTOR PCB SIDE	069J1C0078
CP8103	CONNECTOR PCB SIDE	069J1B0078

Mark	No.	Description	Part No.
	CP8104	CONNECTOR PCB SIDE	069JVZ0200
	CP8105	CONNECTOR PCB SIDE	069EVU3030
	CP8301	CONNECTOR PCB SIDE	069J1C0048
	CP8302	CONNECTOR PCB SIDE	069J1B0048
	CP8303	CONNECTOR PCB SIDE	069EVQ3050
	CP8304	CONNECTOR PCB SIDE	069EVU3050
⚠	F1702	MICRO FUSE 20N_1600FS	0835C01603
	OS651	REMOTE RECEIVER ROM-N3140THC1	077A031004
⚠	TU301	RF UNIT TMQZ2-440A	0162617007
	V651		0967A0R302
		TUBE FLUORESCENT DISPLAY 12-MT-93GNAK	
	X101	CRYSTAL AT-49	100DT4R410
	X801	CRYSTAL HC-49/U-S	100CT01803
	X3001	CRYSTAL B10000C001	100GT01006
	X3002	CRYSTAL DT-26	100DA32R01
	X3003	CRYSTAL HC-49/U-S	100CT01701
	X3301	CRYSTAL DT-26	100DA32R01
	X3302	CRYSTAL B15000H002	100GT01502
	X8201	CERAMIC CSTCE16M0V53-R0	1002T01614
	X8401	CRYSTAL AT-49	100DT4R412

C SERVICE MAIN ASSY

SEMICONDUCTORS

	IC3101	AK5359ET
	IC501	BD7997FS
⚠	IC2401, IC2402	CEK1285
	IC1201, IC1221 Refer to 7.1.10 (P142)	K4H511638C-UCB3
	IC2202	MM1501XN
	IC2201	MM1503XN
	IC1301	NJM12904V
	IC3802	PCA9557PW
	IC3201	PCM1742KE
	IC3707	PST3813U
⚠	IC4512	S-1170B25UC-OTK
⚠	IC4507, IC4511	S-1170B33UC-OTS
⚠	IC4504	S-1170B50UC-OUJ
	IC3103	TC74VHC157FT
	IC3102	TC7SZ126FU
	IC3701	TC7WH34FU
	IC101	UPC3345GC-YEB-A
	IC3202	UPC4570G2-A
	IC1001	UPD61272F1-107KA3A
	IC1102	VYW2366
	Q1801, Q1811, Q2205, Q2206	2SA1576A
	Q2501-Q2505	2SA1576A
	Q3501, Q4561	2SC4081
	Q101	RT1N141U
	D3201	DAN202U
	D3711, D3712	RB501V-40
	D101	SML-310YT

COILS AND FILTERS

	L1010, L106, L107, L112 CHIP COIL	BTH1103
	L1001, L1003, L1004, L1006-L1008	DTL1106
	L1201, L3102, EMI FILTER	DTL1106
	L1811	LCYA150J2520
	L1801	LCYA390J2520

CAPACITORS

	C1081	CCSSCH100D50
	C158-C162, C1813	CCSSCH101J50
	C3207, C3211	CCSSCH121J50
	C1902, C1911	CCSSCH150J50
	C1812	CCSSCH151J50
	C1901, C1912	CCSSCH180J50
	C1803	CCSSCH221J50
	C169, C171, C509	CCSSCH390J50
	C3501, C3808-C3810	CCSSCH470J50
	C1084-C1087	CCSSCH5R0C50
	C510	CCSSCH620J50
	C264	CCSSCH680J50
	C3212	CEAT102M6R3
	C1708, C4507	CEVW100M16
	C2506, C3106, C3214, C3216, C4542	CEVW101M16
	C4563, C5624	CEVW101M16
	C1001, C1003, C1005, C1014, C1020	CEVW221M4
	C1071, C1074, C1235, C5701	CEVW221M4
	C511	CKSQYB105K16
	C105, C1073, C1076, C121-C123	CKSQYB475K6R3
	C125, C133, C135, C152, C153	CKSQYB475K6R3
	C155, C165, C168, C178, C181	CKSQYB475K6R3
	C184, C4508, C4525, C4526	CKSQYB475K6R3
	C4548, C4549, C4552, C5725	CKSQYB475K6R3
	C157, C2221, C2222, C4551	CKSRYB105K10
	C109, C111	CKSRYB334K10
	C101, C102, C136	CKSRYB474K10
	C1009, C1015, C1018, C1021, C1024	CKSRYF105Z10
	C1044, C1047, C1052, C1055	CKSRYF105Z10
	C1061, C1062, C1065, C1070, C1113	CKSRYF105Z10
	C1202, C1204, C1208, C1221, C1223	CKSRYF105Z10
	C1227, C1421, C1801, C1811	CKSRYF105Z10
	C2208, C2209, C2501, C296	CKSRYF105Z10
	C3102, C3103, C3107, C3511, C3703	CKSRYF105Z10
	C3738, C3801-C3805, C5621, C5702	CKSRYF105Z10
	C1010, C1016, C1019, C1022, C1025	CKSSYB102K50
	C1046, C1049, C1054, C1057, C1059	CKSSYB102K50
	C1064, C1067, C1068, C1207	CKSSYB102K50
	C1209, C1210, C1226, C1228, C1229	CKSSYB102K50
	C151, C189, C261, C4527, C4550	CKSSYB102K50
	C119, C1205, C1206, C1224, C1225	CKSSYB103K16
	C129, C130, C142, C164, C1709	CKSSYB103K16
	C187, C188, C221, C2223, C2224	CKSSYB103K16
	C3701, C4509	CKSSYB103K16
	C1026, C1029, C103, C1034, C1037	CKSSYB104K10
	C104, C1040, C1043, C112, C117	CKSSYB104K10
	C124, C126-C128, C132	CKSSYB104K10
	C143, C144, C150, C156, C163	CKSSYB104K10
	C167, C172, C175, C2301, C2302	CKSSYB104K10
	C260, C3806, C3815, C3816	CKSSYB104K10
	C504, C505	CKSSYB104K10
	C137	CKSSYB182K50
	C145, C146	CKSSYB222K50
	C224, C230, C231	CKSSYB223K16
	C108, C110, C139, C141, C1802	CKSSYB331K50
	C3204	CKSSYB331K50
	C114	CKSSYB332K50
	C116	CKSSYB333K10
	C232, C233	CKSSYB471K50
	C148, C220, C223	CKSSYB472K25
	C147, C1804, C1814, C532	CKSSYB473K10
	C297, C3208, C3210	CKSSYB681K50

Mark	No.	Description	Part No.
	C138		CKSSYB682K25
	C154, C236		CKSSYB683K10
	C115		CKSSYB822K16
	C1002, C1004, C1007, C1045, C1048		CKSSYF104Z16
	C1050, C1051, C1053, C1056, C1058		CKSSYF104Z16
	C1060, C1063, C1066, C1069, C1082		CKSSYF104Z16
	C1105, C1203, C1211-C1214, C1222		CKSSYF104Z16
	C1230, C1302, C1303, C1312, C1313		CKSSYF104Z16
	C1701-C1707, C2401-C2406, C3101		CKSSYF104Z16
	C3108, C3201-C3203, C3206, C3209		CKSSYF104Z16
	C4561, C4562, C4565, C501, C503		CKSSYF104Z16
	C113 (2.2/10)		DCG1040
	C502 (10/16)		DCH1165
	C1008, C1017, C107, C1075, C118		DCH1201
	C2210, C2217, C5727-C5729 (10/10)		DCH1201
	C1215 (150/4)		VCH1246

RESISTORS

R501 (0.47/1/4W)		DCN1160
R502 (0.68/1/4W)		DCN1162
R3854		RAB4CQ0R0J
R1411, R240, R3005, R3102, R3707		RAB4CQ103J
R3801-R3806		RAB4CQ223J
R1245, R1246, R1255, R1256		RAB4CQ330J
R1265, R1266, R1273, R1274		RAB4CQ330J
R3810-R3813, R3824		RAB4CQ330J
R254		RAB4CQ473J
R1241, R1242, R1248, R1249		RAB4CQ560J
R1261, R1262, R1268, R1269		RAB4CQ560J
R1281-R1283, R1287		RAB4CQ560J
R3208, R3223		RN1/16SC56R0D
R3207, R3226		RN1/16SE1502D
R3209, R3224		RN1/16SE8201D
R1001, R1002, R133, R2401		RS1/10S0R0J
R4513, R4514, R4517, R4520-R4524		RS1/10S0R0J
R4527, R4591-R4593, R5702		RS1/10S0R0J
R1302, R1303, R1312, R1313		RS1/16S1001F
R5714		RS1/16S1501F
R2502, R2505, R2508, R2511, R2514		RS1/16S2000F
R1301		RS1/16S4700F
R1052		RS1/16S6200F
R3505		RS1/16S75R0F
R1054		RS1/16S9100F
R181		RS1/16SS4701F
R510, R511		RS1/4SA2R0J
R115, R1003-R1008, R1314, R2506		RS1/16S###J
R3837, R3850		RS1/16S###J
Other Resistors		RS1/16SS###J

OTHERS

CN502	4P CONNECTOR	DKN1288
CN501	D-SOCKET(14P)	DKN1312
CN601	5P CONNECTOR	DKN1402
CN101	CONNECTOR	DKN1404

6. ADJUSTMENT

6.1 PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage.
Parts replacing time does not mean the life span for individual parts.
Also, long term storage or misuse may cause transformation and aging of rubber parts.
The following list means standard hours, so the checking hours depends on the conditions.

Time / Parts Name	500 hours	1,000 hours	1,500 hours	2,000 hours	2,500 hours	Notes
Audio Control Head	■	■	■	●	●	Clean those parts in contact with the tape.
Full Erase Head (Recorder only)	■	■	■	●	●	
Capstan Belt		●	●	●	●	Clean the rubber, and parts which the rubber touches
Pinch Roller	■	●	●	●	●	
Capstan DD Unit		●	●	●	●	
Loading Motor					●	
Tension Band		●	●	●	●	
T Brake Band		●	●	●	●	
Clutch Assy		●	●	●	●	
Idler Arm Assy		●	●	●	●	
Capstan Shaft	■	■	■	■	■	
Tape Running Guide Post	■	■	■	■	■	Replace when rolling becomes abnormal.
Cylinder Unit	■	●	●	●	●	Clean the Head

■ : Clean
● : Check it and if necessary, replace it

■ CONFIRMATION OF HOURS USED

PLAY/REC total hours can be checked on the screen.
Total hours are displayed in 16 system of notation.

NOTE: If you set a factory initialization, the total hours is reset to "0".

1. Connect the set to TV Monitor.
2. Turn on the POWER, and set to the VCR mode.
3. Press both **START** button on the set and the **PAUSE LIVE TV** button on the set for more than 2 seconds.
   The **Fig. 1** screen will appear on TV Monitor.
4. After the confirmation of using hours, turn off the power.

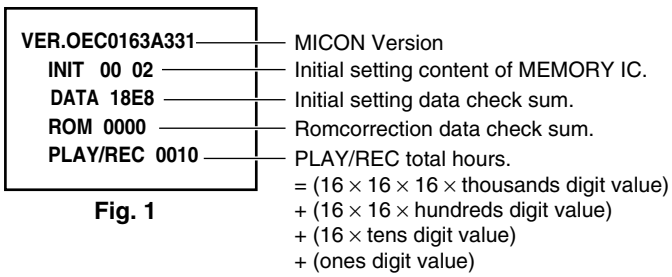
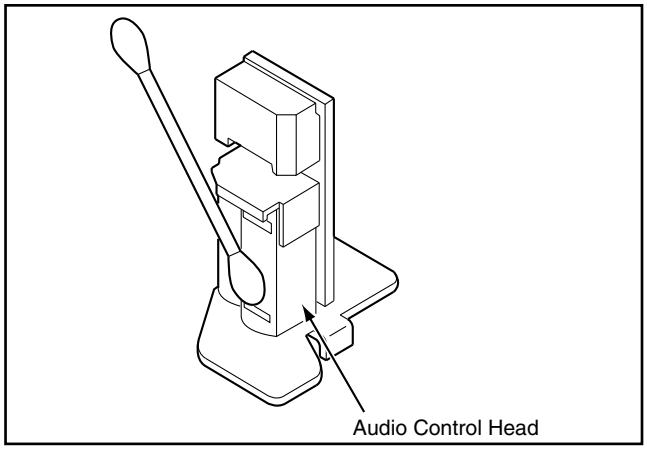


Fig. 1

CLEANING

NOTE
After cleaning the heads with isopropyl alcohol, do not run a tape until the heads dry completely. If the heads are not completely dry and alcohol gets on the tape, damage may occur.

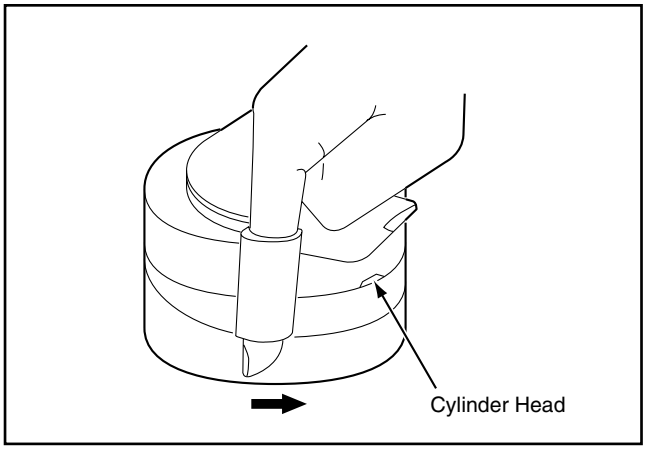
1. AUDIO CONTROL HEAD
Clean the Audio Control Head with the cotton stick soaked by alcohol. Clean the full erase head in the same manner. **(Refer to the figure below.)**



2. TAPE RUNNING SYSTEM
When cleaning the tape transport system, use the gauze moistened with isopropyl alcohol.

3. CYLINDER
Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol. Hold it to the cylinder head softly. Turn the cylinder head counterclockwise to clean it (in the direction of the arrow). **(Refer to the figure below.)**

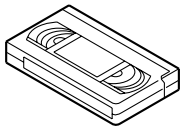
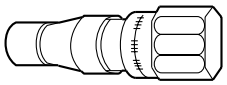
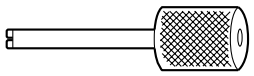
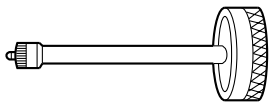
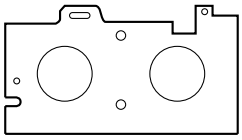
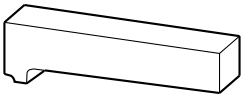
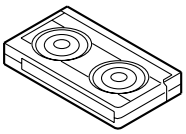
NOTE
Do not exert force against the cylinder head. Do not move the chamois upward or downward on the head.
Use the chamois one by one.



6.2 ADJUSTMENT ITEMS AND NECESSARY ADJUSTMENT POINTS

When	Adjustment Items
■ Replacing Parts of Mechanism Assy	
Replacing REEL DISK (S REEL, T REEL)	Mechanical point 1-1 CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT 1-2 CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION 1-3 CONFIRMATION OF PLAYBACK TORQUE AND BACK TENSION TORQUE DURING PLAYBACK 1-4 CONFIRMATION OF VSR TORQUE 1-5 CONFIRMATION OF REEL BRAKE TORQUE Electrical point None
Replacing TENSION BAND TENSION CONNECT TENSION ARM ASSY T BRAKE BAND T BRAKE SPRING T BRAKE ARM IDLLER ASSY CLUTCH ASSY	Mechanical point 1-2 CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION 1-3 CONFIRMATION OF PLAYBACK TORQUE AND BACK TENSION TORQUE DURING PLAYBACK 1-4 CONFIRMATION OF VSR TORQUE 1-5 CONFIRMATION OF REEL BRAKE TORQUE Electrical point None
Replacing A/C HEAD (AUDIO CONTROL) CYLINDER UNIT ASSY	Mechanical point 2-1 GUIDE ROLLER 2-2 CONFIRMATION AND ADJUSTMENT OF AUDIO/CONTROL HEAD 2-3 TAPE RUNNING ADJUSTMENT (X VALUE ADJUSTMENT) 2-4 CONFIRM HI-FI AUDIO Electrical point 6.6.1 PG SHIFTER
■ Replacing PCB Assy or Electrical Parts	
Replacing SERVICE MAIN ASSY SERVICE LOADER MAIN	Mechanical point None Electrical point 6.6.1 PG SHIFTER 6.8.1 LD POWER ADJUSTMENT
Replacing SERVICE VCR ASSY	Mechanical point None Electrical point 6.6.1 PG SHIFTER
Replacing IC3099 (VCR SIDE EEPROM)	Mechanical point None Electrical point 6.6.1 PG SHIFTER 6.7.1 VCR SIDE EEPROM (IC3099) INITIAL SETTING

6.3 SERVICING FIXTURES AND TOOLS

(For 4 heads model) VHS Alignment Tape GGV1222 (VP_1S-LI6^{3}H) GGV1223 (VP_1S-X6^3) GGV1224 (VP_2L-LI1^3) 	GGF1506 Adapter GGF1507 Dial Torque Gauge (10~90 gf•cm) GGF1508 (60~600 gf•cm) 	GGF1509 Post Adjustment Screwdriver Part No. SV-TG0-030-000 (small) 	GGF1510 X Value Adjustment Screwdriver 
GGF1511 Master Plane 	GGF1512 Reel Disk Height Adjustment Jig 	GGV1186 Torque Tape (VHT-063) 	

[VCR SECTION ADJUSTMENT]

Part No.	Parts Name	Remarks
GGV1222	VHS Alignment Tape (VP_1S-LI6^{3}H)	Hi-Fi Audio **(For 4 heads model)**
GGV1223	VHS Alignment Tape (VP_1S-X6^3)	X Value Adjustment **(For 4 heads model)**
GGV1224	VHS Alignment Tape (VP_2L-LI1^3)	EP Monoscope, 6 kHz **(For 4 heads model)**
GGF1506	Adapter	VSR Torque, Brake Torque (S Reel/T Reel Assy)
GGF1507	Dial Torque Gauge (10~90 gf•cm)	Brake Torque (T Reel Assy)
GGF1508	Dial Torque Gauge (60~600 gf•cm)	VSR Torque, Brake Torque (S Reel)
GGF1509	Post Adjustment Screwdriver	Guide Roller Adjustment
GGF1510	X Value Adjustment Screwdriver	X Value Adjustment
GGF1511	Master Plane	Reel Disk Heifht Adjustment
GGF1512	Reel Disk Height Adjustment Jig	Reel Disk Heifht Adjustment
GGV1186	Torque Tape (VHT-063)	Playback Torque, Back Tension Torque During Playback

[LD POWER ADJUSTMENT]

Part No.	Parts Name	Remarks
GGV1559	Jig for LD Power Adjutment	for LD Power Adjustment
GGV1477	FFC Cable (10P)	for LD Power Adjustment
GGV1054	CD-ROM Test Disc	for LD Power Adjustment
GGF1036	DVD Dual Layer Test Disc	for LD Power Adjustment

6.4 SERVICE MODE LIST

To enter one of the Sub-Service modes, hold a designated key on the unit pressed for a specified period of time while holding another designated key on the unit or on the remote control unit pressed.

Mode of the Unit	Key on the Unit	Key on the Unit	Specified Period (sec)	Description
VCR	START	PAUSE LIVE TV	2	For (1) initial setting of the μ-CON on the VCR side, (2) confirmation of initial settings for the Memory IC, and (3) displaying the accumulated time of playback and recording on the screen.
DVD/HDD	POWER	STOP	2	Initialization to the state at shipment **Note:** Do NOT use this mode during normal servicing. This mode will reset the time setting, channel setting, and the accumulated time of playback/recording.
VCR (Playback)	COPY SELECT	PAUSE LIVE TV	2	For automatic adjustment of the PG shifter Refer to the "6.6 ELECTRICAL ADJUSTMENT".

■ PREPARATION FOR SERVICING

[PREPARATION FOR VCR SECTION SERVICING]

1. Short circuit between **TP3001** and **Ground** with cable.
   (The BOT, EOT, and the Reel Sensor do not work and the VCR deck can be operated without a cassette tape.)
2. In case of using a cassette tape, press the EJECT button to insert or eject a cassette tape.
   Turn on the power and re-check the cable before checking the trouble points.

6.5 MECHANICAL ADJUSTMENTS

1. CONFIRMATION AND ADJUSTMENT

Read the following NOTES before starting work.

- Place an object which weighs between 450g~500g on the Cassette Tape to keep it steady when you want to make the tape run without the Cassette Holder. (Do not place an object which weighs over 500g.)

1-1: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT

1. Turn on the power and set to the STOP mode.
2. Set the master plane (**GGF1511**) and reel disk height adjustment jig (**GGF1512**) on the mechanism framework, taking care not to scratch the drum, as shown in **Fig. 1-1-A**.
3. While turning the reel and confirm the following points. Check if the surface "A" of reel disk is lower than the surface "B" of reel disk height adjustment jig (**GGF1512**) and is higher than the surface "C". If it is not passed, place the height adjustment washers and adjust to 10 (+2, -0) mm.
4. Adjust the other reel in the same way.

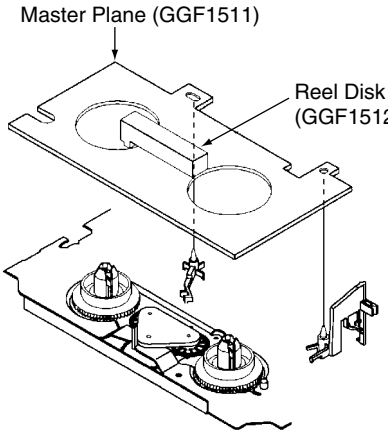


Fig. 1-1-A

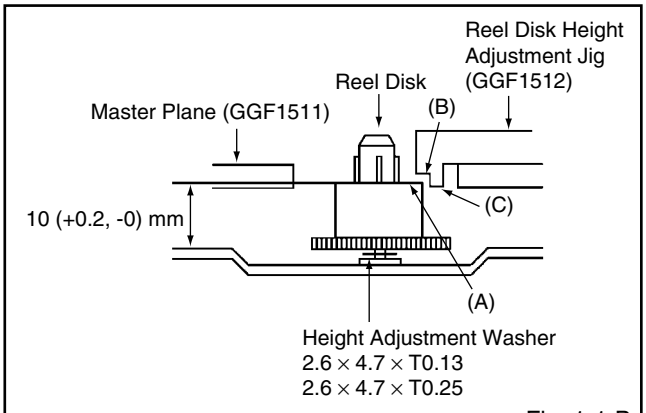


Fig. 1-1-B

1-2: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

1. Set to the PLAY mode.
2. Adjust the adjusting section for the Tension Arm position so that the Tension Arm top is within the standard line of Main Chassis.
3. While turning the S Reel clockwise, confirm that the edge of the Tension Arm is located in the position described above.

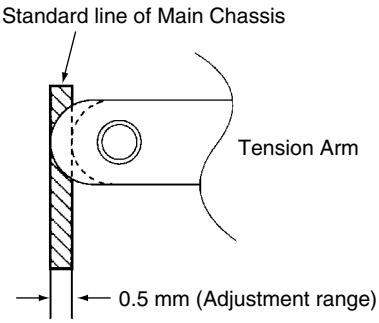


Fig. 1-2-A

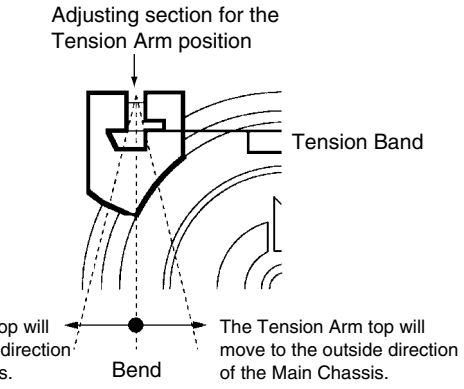


Fig. 1-2-B

1-3: CONFIRMATION OF PLAYBACK TORQUE AND BACK TENSION TORQUE DURING PLAYBACK

• USING A CASSETTE TYPE TORQUE TAPE (**GGV1186**)

1. After confirmation and adjustment of Tension Post position (**Refer to item 1-2**), load the cassette type torque tape (**GGV1186**) and set to the PLAY mode.
2. Confirm that the right meter of the torque tape indicates 50~90gf•cm during playback in SP mode.
3. Confirm that the left meter of the torque tape indicates 25~40gf•cm during playback in SP mode.

1-4: CONFIRMATION OF VSR TORQUE

1. Install the Torque Gauge (**GGF1508**) and Adapter (**GGF1506**) on the S Reel. Set to the Picture Search (Rewind) mode. (**Refer to Fig.1-4-B**)
2. Then, confirm that it indicates 120~180gf•cm.

NOTE

Install the Torque Gauge on the reel disk firmly. Press the REW button to turn the reel disk.

1-5: CONFIRMATION OF REEL BRAKE TORQUE

(S Reel Brake) (**Refer to Fig. 1-4-B**)

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of **Fig. 1-4-A**.
2. Move the Idler Assy from the S Reel.
3. Install the Torque Gauge (**GGF1508**) and Adapter (**GGF1506**) on the S Reel. Turn the Torque Gauge (**GGF1508**) clockwise.
4. Then, confirm that it indicates 60~100gf•cm.

(T Reel Brake) (**Refer to Fig. 1-4-B**)

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of **Fig. 1-4-A**.
2. Move the Idler Assy from the T Reel.
3. Install the Torque Gauge (**GGF1507**) and Adapter (**GGF1506**) on the T reel. Turn the Torque Gauge (**GGF1507**) counterclockwise.
4. Then, confirm that it indicates 30~50gf•cm.

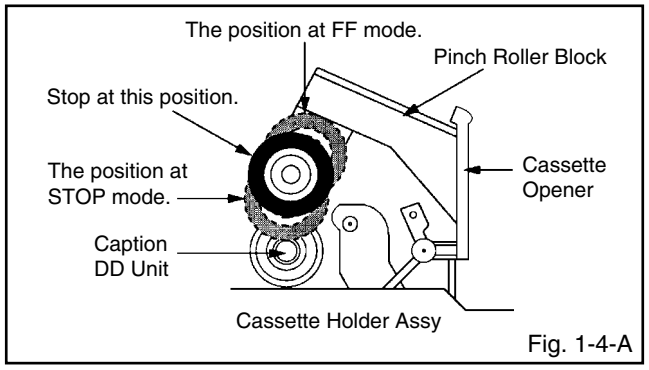


Fig. 1-4-A

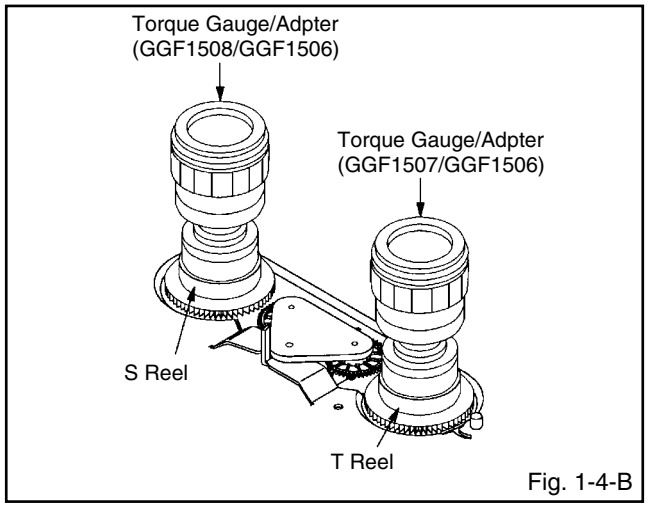


Fig. 1-4-B

NOTE

If the torque is out of the range, replace the following parts.

Check Item	Replacement Part
1-4	Idler Assy / Clutch Assy
1-5	S Reel side : S Reel/ Tension Band/Tension Connect/Tension Arm Assy T Reel side : T Reel/ Brake Band/T Brake Spring /T Brake Arm

2. CONFIRMATION AND ADJUSTMENT OF TAPE RUNNING MECHANISM

Tape Running Mechanism is adjusted precisely at the factory. Adjustment is not necessary as usual. When you replace the parts of the tape running mechanism because of long term usage or failure, the confirmation and adjustment are necessary.

2-1: GUIDE ROLLER

1. Playback the VHS Alignment Tape (**GGV1222**). (**Refer to SERVICING FIXTURE AND TOOLS**)
2. Connect CH-1 of the oscilloscope to **TP101** (**Envelope**) and CH-2 to **TP3002** (**SW Pulse**).
3. Press and hold the ATR button on the remote control more than 2 seconds to set tracking to center.
4. Trigger with SW Pulse and observe the envelope. (**Refer to Fig. 2-1-A**)
5. When observing the envelope, adjust the Adjusting Driver (**GGF1509**) slightly until the envelope will be flat. Even if you press the Tracking Button, adjust so that flatness is not moved so much.
6. Adjust so that the A : B ratio is better than 3 : 2 as shown in **Fig. 2-1-B**, even if you press the Tracking Button to move the envelope (The envelope waveform will begin to decrease when you press the Tracking Button).
7. Adjust the PG shifter during playback. **(Refer to the ELECTRICAL ADJUSTMENTS)**

NOTE

After adjustment, confirm and adjust A/C head. **(Refer to item 2-2)**

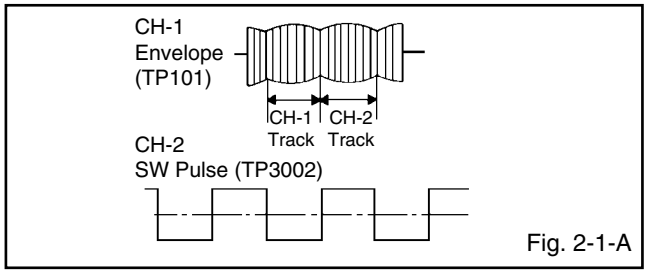


Fig. 2-1-A

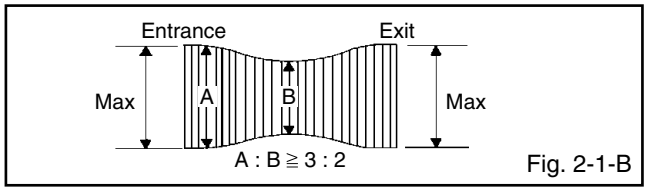


Fig. 2-1-B

2-2: CONFIRMATION AND ADJUSTMENT OF AUDIO/CONTROL HEAD

When the Tape Running Mechanism does not work well, adjust the following items.

1. Playback the VHS Alignment Tape (**GGV1222**). (Refer to SERVICING FIXTURE AND TOOLS)
2. Confirm that the reflected picture of stamp mark is appeared on the tape prior to P4 Post as shown in **Fig. 2-2-A**.
   a) When the reflected picture is distorted, turn the screw ① clockwise until the distortion is disappeared.
   b) When the reflected picture is not distorted, turn the screw ① counterclockwise until little distortion is appeared, then adjust the a).
3. Push the "AUDIO SELECT" button of remote control and select the monaural audio. At this time, "MONAURAL" is displayed on the TV screen at the lower left.
4. Turn the screw ② to set the audio level to maximum.
5. Confirm that the bottom of the Audio/ Control Head and the bottom of the tape is shown in **Fig. 2-2-C**.
   c) When the height is not correct, turn the screw ③ to adjust the height. Then, adjust the 1~3 again.

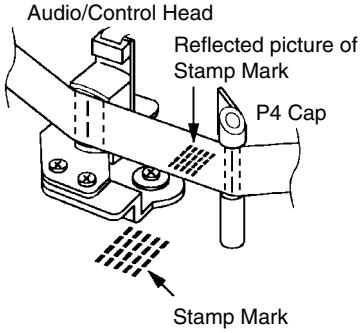


Fig. 2-2-A

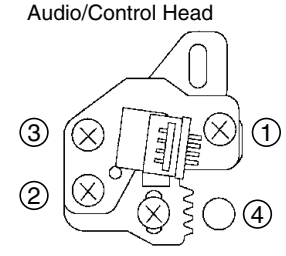


Fig. 2-2-B

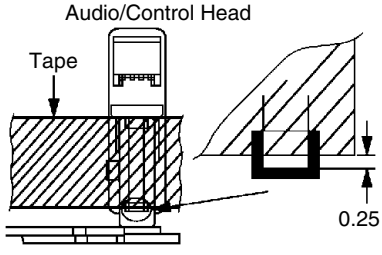


Fig. 2-2-C

2-3: TAPE RUNNING ADJUSTMENT (X VALUE ADJUSTMENT)

1. Confirm and adjust the height of the Reel Disk. (**Refer to item 1-1**)
2. Confirm and adjust the position of the Tension Post. (**Refer to item 1-2**)
3. Adjust the Guide Roller. (**Refer to item 2-1**)
4. Confirm and adjust the Audio/Control Head. (**Refer to item 2-2**)
5. Connect CH-1 of the oscilloscope to **TP3002**, CH-2 to **TP101** and CH-3 to **HOT side of Audio Out Jack**.
6. Playback the VHS Alignment Tape (**GGV1223**). (**Refer to SERVICING FIXTURE AND TOOLS**)
7. Press and hold the ATR button on the remote control more than 2 seconds to set tracking to center.
8. Set the X Value adjustment driver (**GGF1510**) to the ④ of **Fig. 2-2-B**. Adjust X value so that the envelope waveform output becomes maximum. Check if the relation between Audio and Envelope waveform becomes (1) or (2) of **Fig. 2-3**.
9. Playback the VHS Alignment Tape (**GGV1224**). (**Refer to SERVICING FIXTURE AND TOOLS**)
10. Check if the picture is played back correctly.

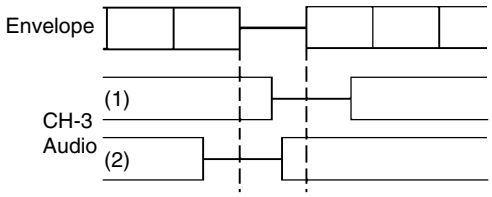
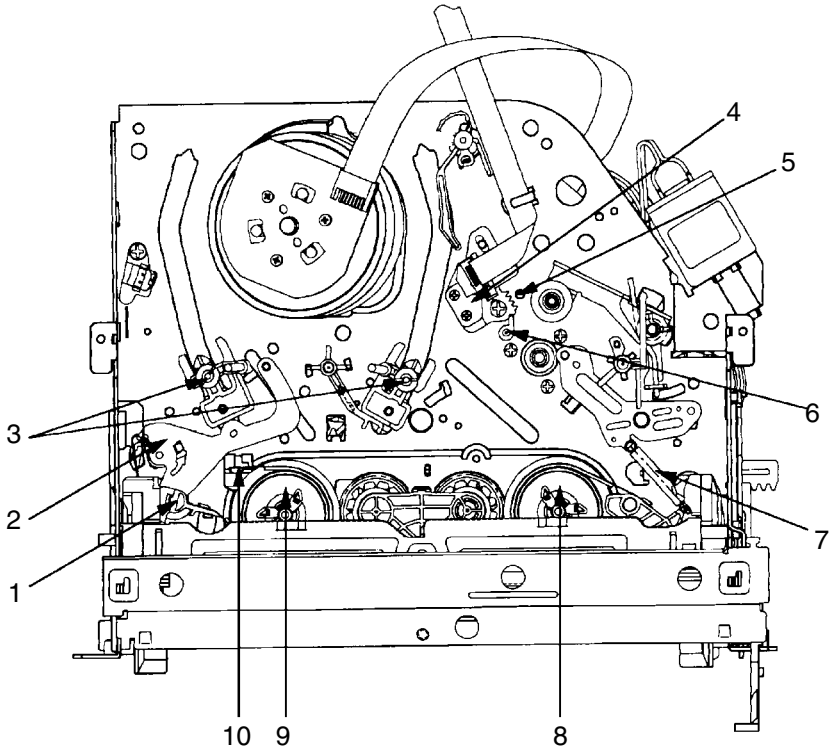


Fig. 2-3

2-4: CONFIRM HI-FI AUDIO (Hi-Fi model only)

1. Connect CH-1 of the oscilloscope to **TP101** and CH-2 to the **Hi-Fi Audio Out Jack**.
2. Playback the VHS Alignment Tape (**GGV1222**). (**Refer to SERVICING FIXTURE AND TOOLS**)
3. Press and hold the ATR button on the remote control more than 2 seconds to set tracking to center.
4. Press the Tracking Up button and count number of steps which the audio output is changed from Hi-Fi (10KHz) to MONO (6KHz).
5. Press and hold the ATR button on the remote control more than 2 seconds to set tracking to center.
6. Press the Tracking Down button and count number of steps which the audio output is changed from Hi-Fi (10KHz) to MONO (6KHz).
7. If the difference are more than 3 steps, set the X Value adjustment driver (**GGF1510**) to ④ of Fig. 2-2-B. Change the X Value and adjust it so that the value becomes within 2 steps.

3. MECHANISM ADJUSTMENT PARTS LOCATION GUIDE



1. Tension Connect
2. Tension Arm
3. Guide Roller
4. Audio/Control Head
5. X value adjustment driver hole
6. P4 Post
7. T Brake Spring
8. T Reel
9. S Reel
10. Adjusting section for the Tension Arm position

6.6 ELECTRICAL ADJUSTMENTS

Read and perform this adjustment when repairing the circuits or replacing electrical parts or PCB assemblies.

6.6.1 PG SHIFTER

CONDITIONS

MODE-PLAYBACK
Input Signal-Alignment Tape (**GGV1222**)

INSTRUCTIONS

1. Connect CH-1 on the oscilloscope to **TP102 (H.SW)** and CH-2 to **J8402 (VIDEO OUT)**.
2. Confirm that TP3001 and GND are connected by the cable and shortened. (preparation for VCR adjustment)
3. Press **EJECT** button on the set and insert the alignment tape (GGV1222).
4. Playback the alignment tape. (**GGV1222**)
5. Press both **COPY SELECT** button on the set and the **PAUSE LIVE TV** button on the set for more than 2 seconds and start the auto-adjustment.
6. Confirm that the head switching pulse wave form is like Fig.1-1-A/Fig.1-1-B.

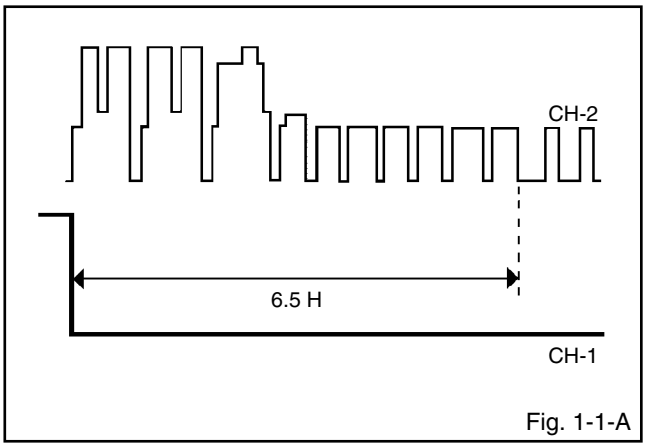


Fig. 1-1-A

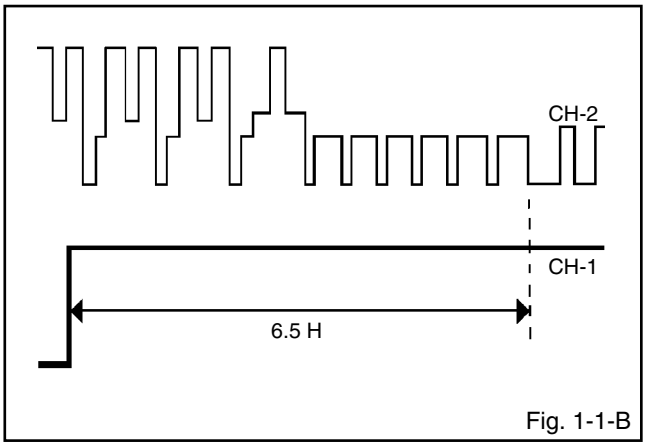
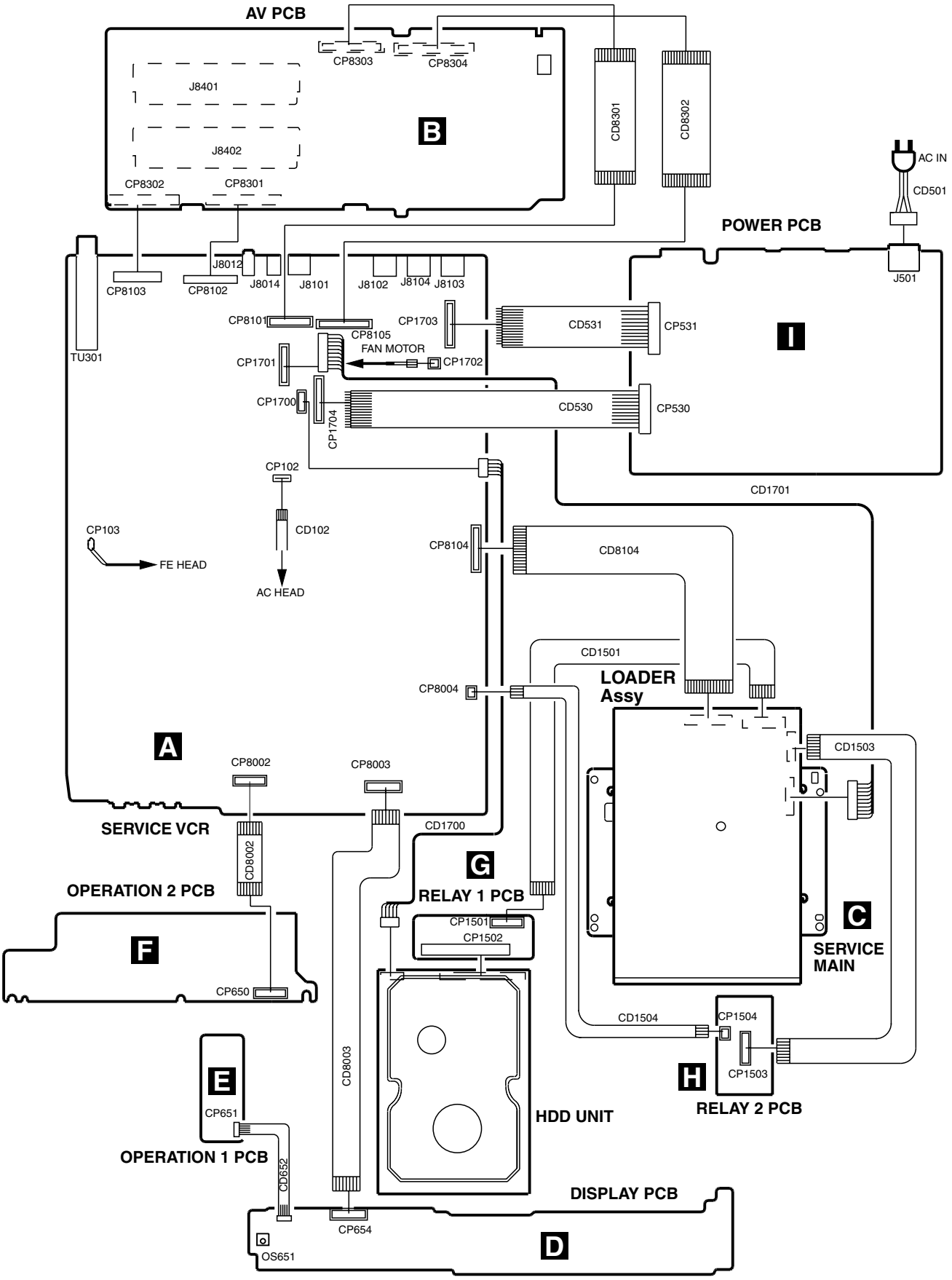


Fig. 1-1-B

2. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



6.7 WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

NOTE: After the DATA change, if the ENTER button is not pressed at the DATA selection mode and the power is turned off, the DATA change does not performed.
After the DATA change, press the ENTER button by all means and set to the ADDRESS selection mode, then turn off the power.

■ VCR side EEPROM (IC3099) initial setting

* Do not change other adress data.

INIT	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	02	15	82	14	64	64	4A	17	00	10	29	07	04	05	03	00
10	BB	A2	9F	93	00	00	32	04	88	A5	9F	3A	00	0D	BF	00
20	BB	BB	00	01	1D	2D	05	04	00	00	24	42	30	60	56	65
30	5E	00	AF	1A	FA	5F	04	02	65	5F	00	9F	2C	FA	5F	5F
40	00	9F	18	FA	4F	B3	13	04	00	21	01	FF	FF	FF	FF	FF

Table 1

1. Connect the set to TV Monitor.
2. Turn on the POWER, and set to the **VCR mode**.
3. Press both **START** button and set the **PAUSE LIVE TV** button on the remote.
   ADDRESS and DATA will appear on TV Monitor as **Fig 1** and the ADDRESS is now selected.

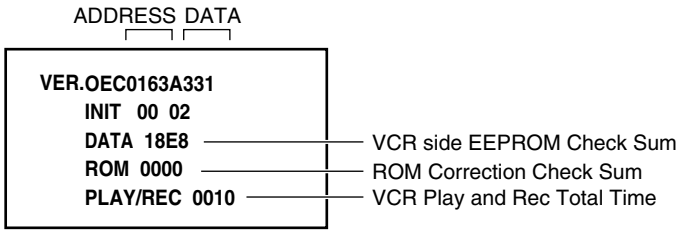


Fig. 1

4. ADDRESS is now selected and should "blink". Using the Tracking + or - button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
5. Press ENTER to select DATA. When DATA is selected, it will "blink".
6. Again, step through the DATA using Tarcking + or - button until required DATA value has been selected.
7. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
8. Repeat steps 4 to 7 until all data has been checked.
9. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input.
10. Unplug the AC cord, then plug it in.

6.8 LD POWER ADJUSTMENT

[Purpose]

If the combination of MAIN Assy and LOADER Assy is changed, the adjusted value for LD power will be shifted, and stable playback or recording of a disc will become impossible.
Therefore, when the combination of MAIN Assy and LOADER Assy is changed, LD power adjustment and adjustment for disc judgment will be necessary.
Be sure to do this adjustment at following cases.

- When replacing MAIN Assy
- When replacing LOADER Assy

[Tools to be used]

- Special tool for adjusting the LD power (GGF1559)
- 10-pin FFC flexible cable (GGD1477)
- CD-ROM test disc: CDT-313 (GGV1054)
- DVD dual-layer test disc: DVDT-002 (GGV1036)

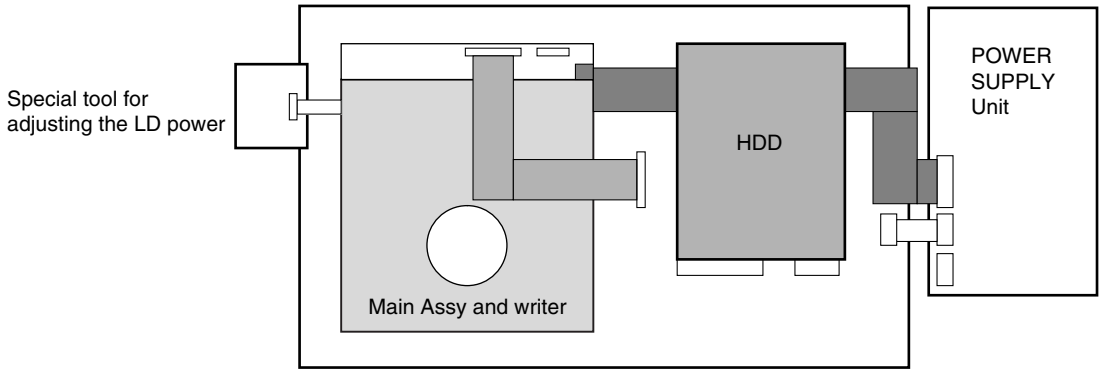
[Notes]

Never turn the power off while any of the following operations is in progress:

- While laser diode (LD) power adjustment is being performed normally by the unit
- While adjustment for disc judgment is being performed

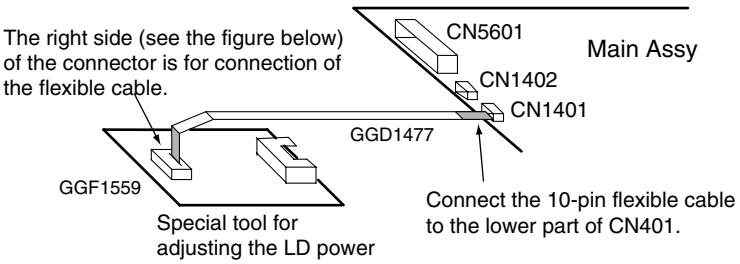
[Connections]

- Connections for adjusting the LD power

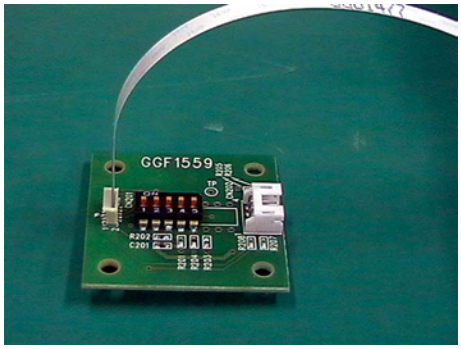


Note: Before adjusting the LD power, disconnect the power to the HDD and the flexible cable for ATA (40-pin).

- To which the special tool for adjusting the LD power is connected



- Setting of the switches on the special tool for adjusting the LD power



GGF1559

Set all five switches to ON.

[Procedures]

1. Connect the special tool for adjusting the LD power, as shown on the previous page.

2. Turn on the DVD recorder. ("POWER ON" will be indicated on the FL display.)

3. The tray opens.
   Make sure that powered opening of the tray is working.
   If the tray does not open under power:
   a. Flexible cables or other cables may not be connected. (Connection of cables to the HDD is not necessary.)
   b. Wrong setting of the switches on the special tool for adjusting the LD power, or failure in the special tool or the 10-pin flexible cable, is suspected.
   c. Failure in the loader, MAIN Assy, or POWER SUPPLY Unit is suspected.

   Make sure that the LED next to CN401 is lit.
   If the LED flashes:
   a. Wrong setting of the switches on the special tool for adjusting the LD power, or failure in the special tool or the 10-pin flexible cable, is suspected.

4. Manually close the tray. Adjust the LD power.
   Make sure that the LED next to CN401 is lit.
   If the LED flashes three or four times in a burst:
   a. The PU flexible cable may not be connected.
   b. Failure in the Traverse Mechanism or MAIN Assy is suspected.

5. After adjusting the LD power, invoke powered opening of the tray. *(LD power adjusting time : about 60 sec.)*
   Make sure that the LED next to CN401 flashes once per burst.

6. Load the DVDT-002 on the tray.
   The tray automatically closes after 15 seconds.
   The tray repeatedly closes and opens automatically until a disc is loaded.

7. After adjustment for judging the DVD disc, the tray automatically opens.
   Make sure that the LED next to CN401 flashes twice in a burst. *(DVD disc discrimination adjusting time : about 25 sec.)*
   If the LED flashes only once per burst:
   a. A disc other than the DVDT-002 may be loaded. Be sure to load the DVDT-002.

8. Replace the DVDT-002 with the CDT-313.
   The tray automatically closes after 15 seconds.
   The tray repeatedly closes and opens automatically until a disc is loaded.

9. After adjustment for judging the CD disc, the tray automatically opens.
   Make sure that the LED next to CN401 is unlit. *(CD disc discrimination adjusting time : about 25 sec.)*
   If the LED flashes twice in a burst:
   a. A disc other than the CDT-313 may be loaded. Be sure to load the CDT-313.

10. Unload the CDT-313 and manually close the tray.

11. Turn off the recorder by holding the POWER button pressed for several seconds.

12. Disconnect the 10-pin FFC cable from the MAIN Assy.

13. Set the power sources for the HDD and the flexible connecting cable for ATA (40-pin) to their original statuses.

[Points to be confirmed]

1. Make sure that real-time recording on a DVD-R/-RW/RAM will finish normally.
2. Play back a recorded disc and make sure that playback is performed without a problem.

7. GENERAL INFORMATION

7.1 DIAGNOSIS

◆ Jigs and Tools to be used

Remote control unit for serving (GGF1381)
DVD Recorder Data Disc (Type 2)(*)
Download disc
Test disc (GGV1025)
DVD-RW (Commercial goods)

(*) Be sure to use the latest disc (Type 2).
In May, 2006, the latest disc is GGV1273.

◆ Service Mode List

1. Setting type

Item	When to perform
7.1.1 Model setting	• When replacing SERVICE MAIN ASSY or SERVICE VCR ASSY.
7.1.2 CPRM ID number and data	• When "CPRM ERROR" is displayed on the display screen. • After the MAIN ASSY or HDD replaced.
7.1.3 Firmware downloading method	• After model setting (After replacing SERVICE MAIN ASSY, SERVICE VCR ASSY). • After the HDD is replaced. • When NG is displayed for the version infomation in Service mode.
7.1.4 Video Adjustment for Specific Area	• When a flicker appears on the tuner display like a horizontal or vertial out-of-sync symptom
7.1.5 (5) OSD Filter Setting	• When a character flicker appears on the OSD depending on the monitor.

2. Diagnosis type

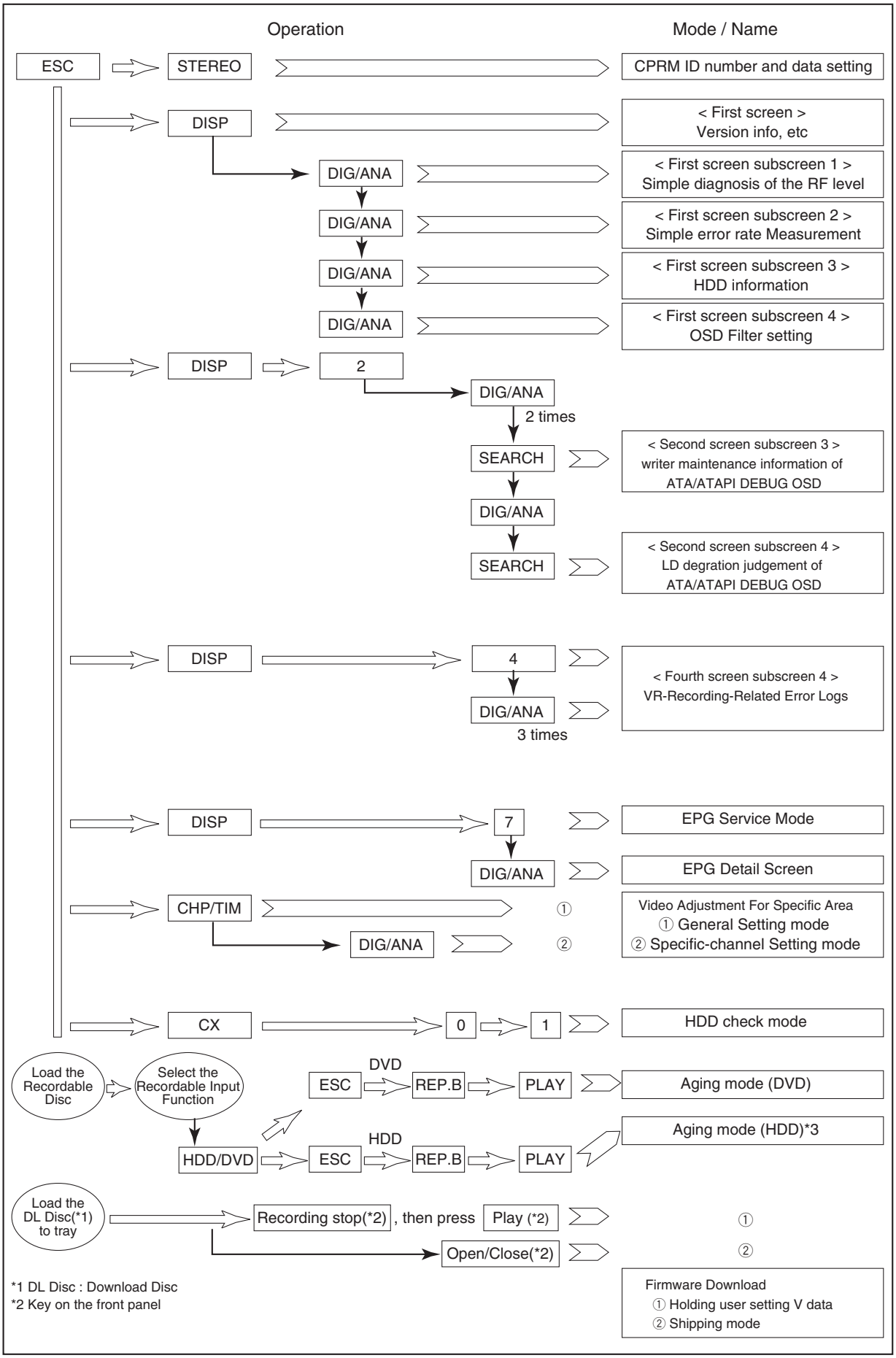
7.1.5 Service Mode First screen : Version, Simple diagnosis of the RF level, Simple error rate measurement, HDD information, OSD Filter setting. Second screen : ATA/ATAPI debug screen, LD degration judgement Fourth screen : VR-recording-related error loss	• When confirming version infomation • When confirming the state of LOADER Assy.
7.1.6 EPG Service Mode	When EPG data cannnot be or can be only partially obtained.
7.1.7 Aging Mode	When a claimed sympton is difficult to reproduce.
7.1.8 HDD Check Mode	When checking the quality of HDD.

◆ Necessary procedure List when replacing Assys

Following is the surely necessary procedures and the produet state after changing when replacing next ASSYs.

Replaced ASSY	Necessary setting	State after replacing	
		User setting	HDD contents
SERVICE MAIN ASSY	1. Model setting 2. LD power adjustment 3. CPRM setting 4. Firmware update	×	○
SERVICE VCR ASSY	1. Model setting 2. Firmware update	×	○
SERVICE LOADER ASSY	1. LD power adjustment	○	○
HDD	1. CPRM setting 2. Firmware update	○	×

◆SERVICE MODE MAP



7.1.1 MODEL SETTING

[Purposes]

When the SERVICE MAIN Assy and/or SERVICE VCR Assy that are(is) commonly used with another model are(is) replaced, they(it) must recognize the model of this unit.

Items to be set: The model number, destination, and region No. must be set.

[Tool to be used]

Remote control unit for servicing
(GGF1381)

[Notes]

- Once the setting has been made, it can never be changed. Be sure to make the setting correctly.
- As this setting resets the Assy(s) in question to the factory-preset status, it is recommended that you obtain the customer's consent beforehand.

[Procedures]

① After power on, the following screen is displayed on TV monitor. Press four digits properly by using the remote control unit for service, according to the screen information.

```
[Recorder's Model Setting]
 Input the number using the remote for Service.

> - - -

  Input No.      Model
  [  0117   :   DVR-RT602H/YXTL5 ]
```

②Disconnect then reconnect the AC power cord of the unit. Be careful not to impart vibration to the unit immediately after the AC power cord is disconnected.

③ Reset the recorder to all its factory settings.
(Make sure that the recorder is on. Press and hold ■ (STOP) key and press ⏻ (STANDBY/ON) key on the front panel.)
The recorder turns off with all settings reset.

④ Press [ESC] then [DISP] keys by using the remote control unit for servicing, and then confirm each Model Name (for example " DVR-RT602H/YXTL5 ").

```
DVR-RT602H/YXTL5        VERSION      : 2.**
  SYSCON   : RELEASE_231
             Rev     :1.11966.2.60.2.46
TUNERCON   : 501.000                    OK
    DRIVE  : DVD-RW DVR-L11X            OK
             1.04                       OK

     HDD   : WDC WD800BB-55JK           80

  IRCON    : 1.02                       OK

   DEVICE  : E2R-FE  1.2  FLASH  : 64M
  REGION   : 2            C : * * * * * * * * *
 VHS_VER   : 0163AC19A  CHECK_SUM :* * * * * * * * *
```

⑤ End

7.1.2 CPRM ID NUMBER AND DATA SETTING

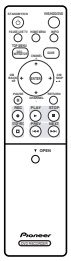
[Purposes]

For the DVD recorder,it is necessary with the recoding/playback of DVD–RW disc to set an individual number (ID number) and ID data to each recorder. If the number and data are not set correctly with the following procedure, cannot work with residual quantity 0:00 or operations in the future may not be guaranteed with RW disc. You will find the ID number to be set on the ID label on the rear panel.

The Input is Necessary When:

- " CPRM ERR" is displayed on the FL display immediately after the power is turned on or in Stop mode.
- When the SERVICE MAIN ASSY or the HDD is exchanged.

[Tools to be used]



Remote control unit supplied with the unit (07660ML010)

Remote control unit for servicing (GGF1381)

DVD Recorder Data Disc (Type 2)

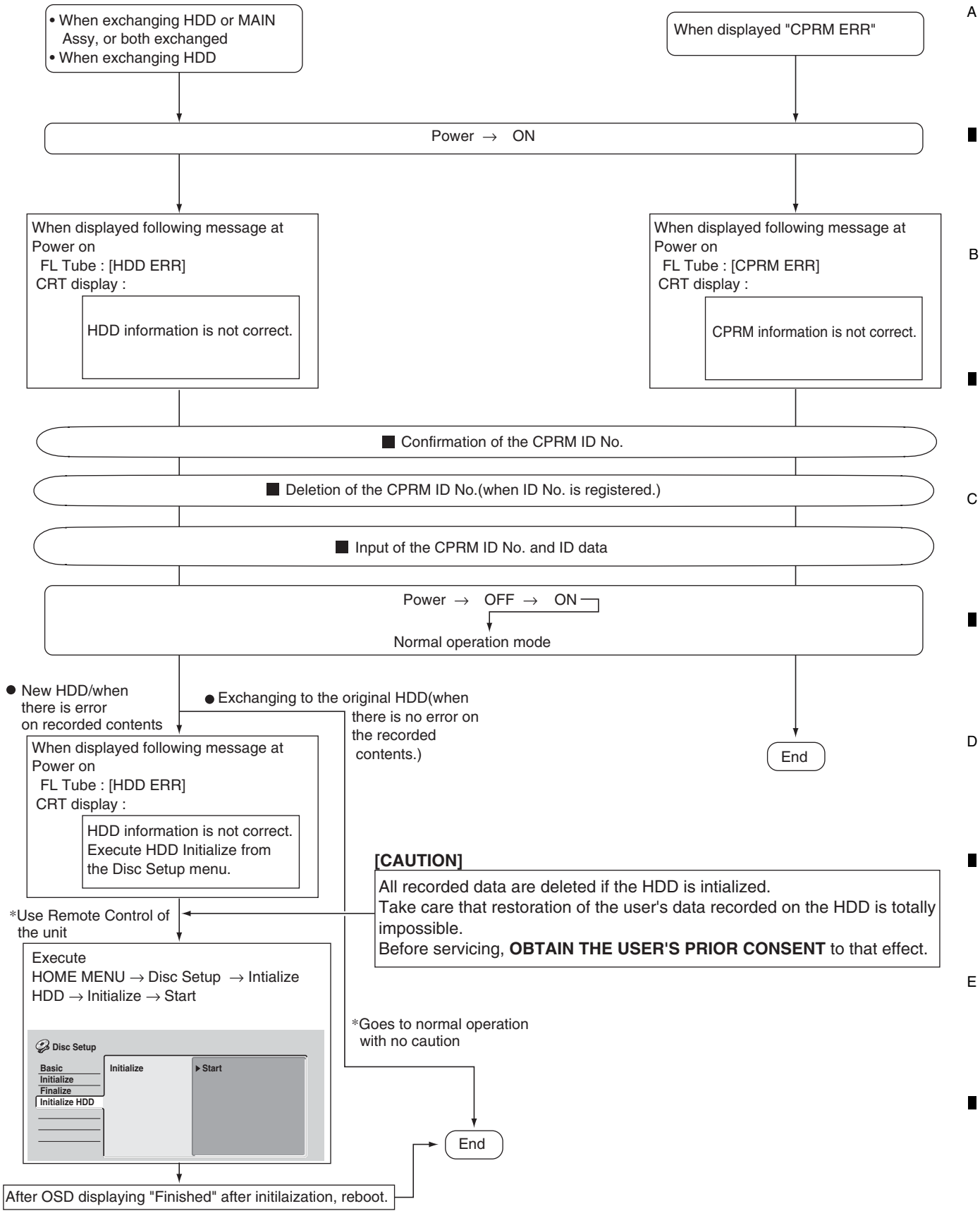
Be sure to use the latest disc (Type 2).
In May, 2006, the latest disc is GGV1273.

[Notes]

Important: If no ID label is found on the rear panel, write down the specified ID number by checking it according to "How to confirm the ID number" shown below.

- Input the ID number while the unit is in Stop mode.
- After the data are read from the data disc (Type 2), the disc will automatically be unloaded.

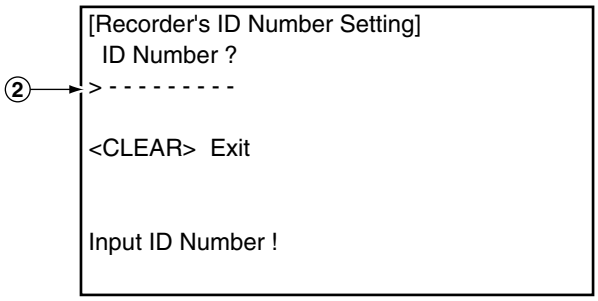
■ Input Flow of the ID No. and ID data when exchanging HDD or MAIN Assy



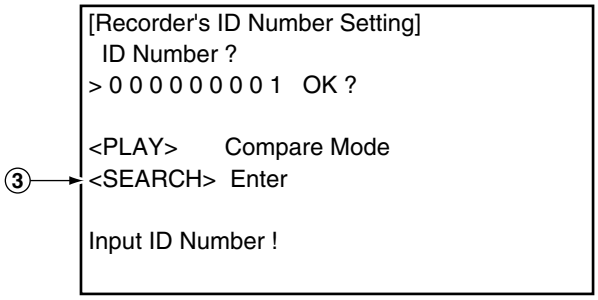
How to Input the ID Number and ID Data

① To enter the input mode, press ESC+STEREO keys sequentially in a status with no ID number set, such as after FLASH-ROM downloading.

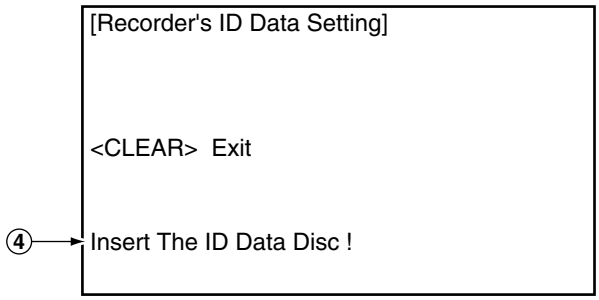
② As number input is enabled when the unit enters the input mode, input the 9-digit ID number.
(The entered number is also displayed on the FL display.)



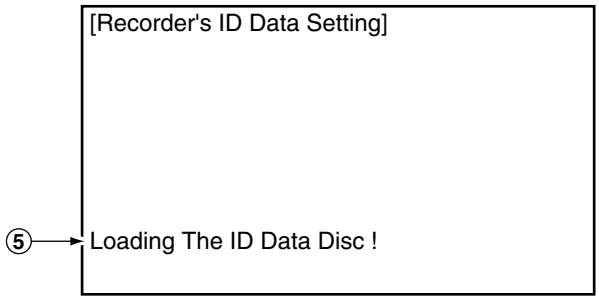
③ After inputting the number, press SEARCH keys to register the ID number.



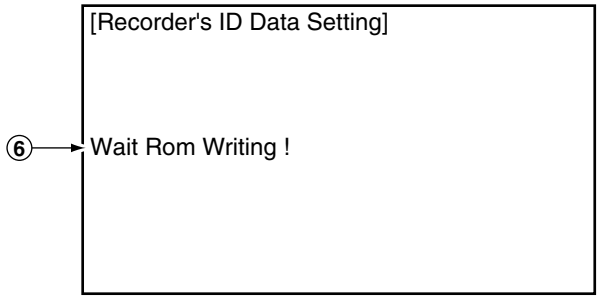
④ When the ID number has been registered, the unit enters the ID data input mode. (The FL display indicates "INSERT ID.")
In this condition, place the ID data disc on the tray and close the tray using the CLOSE key "■/⏏" on the player.



⑤ While the data are being read, the message shown in the figure at left is displayed on the screen.
(The FL display indicates "LOAD ID.")

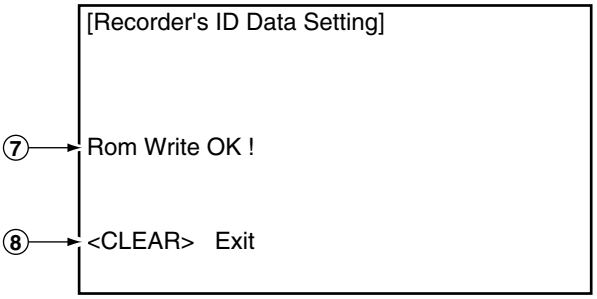


⑥ When the ID data have been read, the data are written to the FLASH-ROM.
(The FL display indicates "WRITE ID.")



⑦ When the ID data have been written to the FLASH-ROM, the message "Rom Write OK" is displayed on the screen.
(The FL display indicates "ID OK.")

⑧ After confirming this message, press CLEAR key to exit the input mode.

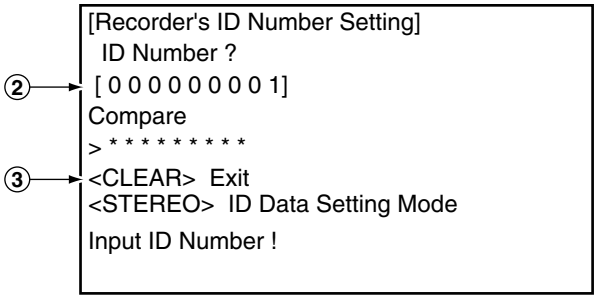


[How to Confirm the ID Number]

① Press ESC + STEREO keys sequentially with an ID number already set, and the unit enters the ID number confirmation mode.

② The set ID number is displayed on the screen (and on the FL display), permitting you to confirm it.

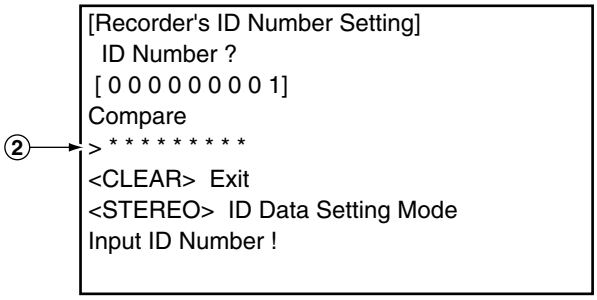
③ To exit this mode, press CLEAR key.



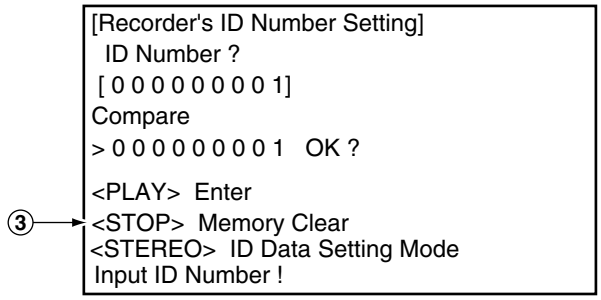
[How to Clear the ID Number]

① Press ESC + STEREO keys sequentially with an ID number already set, and the unit enters the ID number confirmation mode.

② Input the same number as the ID number you have set.



③ After inputting the number, press STOP key.
Only when the entered number matches the set ID number, the ID number is cleared and the unit exits this mode.
If the numbers do not match, you must return to step ②.
(STOP key is not accepted until 9 digits are entered.)



7.1.3 FIRMWARE DOWNLOADING METHOD

[Purposes]

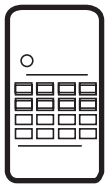
1. When the main board is replaced, the firmware versions for the system control computer, drive, IR microcomputer and the TUFL microcomputer do not match, and operations of the unit may be destabilized.
   To match the versions for the above four, firmware downloading is necessary in the following two cases:
   ① After the model setting
   ② When NG is displayed on the first screen (version information, etc.) of Service mode
   ③ After changing SERVICE MAIN Assy or SERVICE VCR Assy

2. Rewriting the firmware to the latest version may ameliorate the symptoms claimed by the customer.

There are the following two methods for downloading: disc download and serial download

1. DISC DOWNLOAD

[Tools to be used]



Remote control unit for servicing (GGF1381)

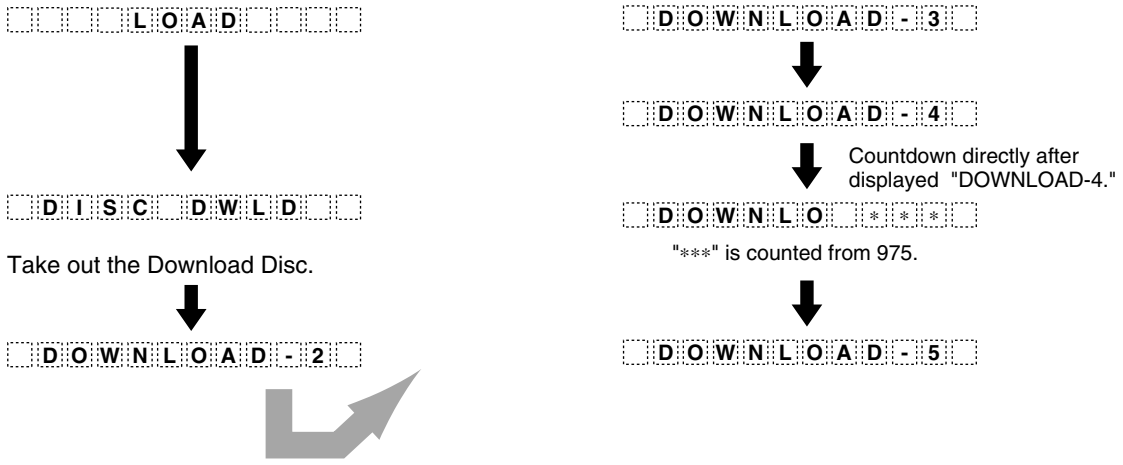
Download DISC

[Notes]

Be sure NOT to turn off the unit during downloading.
If the unit is turned off during downloading, the SYSCON, TUNERCON, LOADER and IR Blaster programs may not be properly rewritten, in which case the unit may not be able to initialize itself normally when turned on again.

[Procedure] ① Open a disc tray by pressing the "OPEN/CLOSE" button.
② Put the download disc on the tray. Press a " START " button while pressing a "PLAY" button on the frontpanel.
* The disc tray closes automatically and the disc is loaded.
* The disc tray opens automatically after loading.

FL display



* After download is completed, the power turns off, and turns on and a disc tray closes automatically.
* It takes for about 7-8 minutes until download is completed.

④ Press and hold a " ESC " button, then press " DISP " button on the remote control unit for servicing.
⑤ Confirm a firmware release version.
⑥ Press " ESC " button on the remote control unit for servicing in order to exit the test mode.

[Tips]

(1) If the power is not correctly turned on or when the power is shut off during downloading, proceed as follows before performing download again:

- In a case where downloading was incorrectly terminated while "DOWNLOAD-2" was displayed on the FL display:
  The SYSCON program will not function correctly.
  If the program cannot be downloaded from the disc or through serial communication, replace the MAIN ASSY.

- In a case where downloading was incorrectly terminated while "DOWNLOAD-3" was displayed on the FL display:
  The DRIVE program will not function correctly.
  If the program cannot be downloaded from the disc or through serial communication, replace the MAIN Assy.

- In a case where downloading was incorrectly terminated while "DOWNLOAD-4" was displayed on the FL display
  The program for the tuner microcomputer will not function correctly.
  If the program cannot be downloaded from the disc, replace the TUNERCON microcomputer (IC101 : TUJB ASSY).

- In a case where downloading was incorrectly terminated while "DOWNLOAD-5" was displayed on the FL display
  The program for the IR Blaster microcomputer will not function correctly.
  If the program cannot be downloaded from the disc, replace the IR Blaster microcomputer (IC801 : TUJB ASSY).

(2) The setting way to shipping mode (Reference)
At ② lines of the [Procedures], press a "VHS EJECT" button while pressing a "START" button.

2. SERIAL DOWNLOAD

[Purposes]

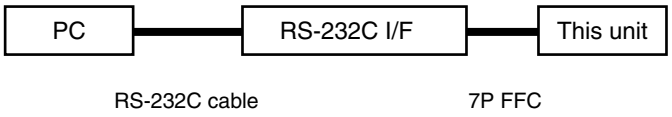
1. When the main board is replaced, the firmware versions for the system control computer, drive, and the TUFL microcomputer do not match, and operations of the unit may be destabilized. In such a case, the versions for the above three must be matched.
2. This method is used when disc downloading fails.

[Tools to be used]

* PC with serial port
* RS-232C straight cable
* RS-232C I/F jig (GGF1348)
* 7P FFC (VDA1681)
* Download program (UFU.exe)
* Firmware

[Connection]

Connect as follows:



[Procedures]

① Connect the 232C I/F jigs above way.

② Turn on the PC and start the " UFU.exe ".

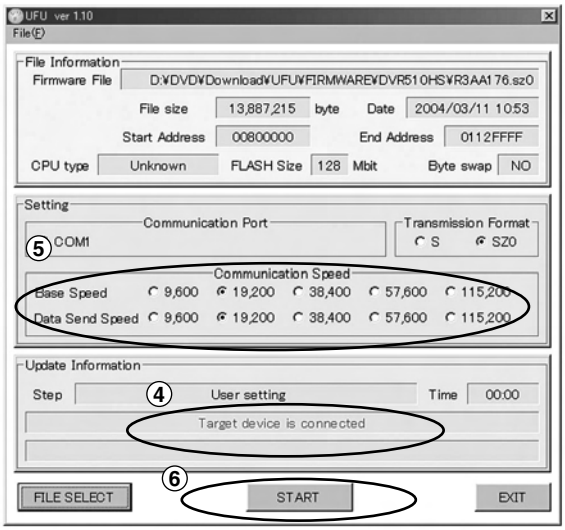
③ Select the Firmware file. ("sz0" file)

④ Turn the DVD recorder on and start the download program.
" Target Device is connected " is appeared on the screen.

⑤ Select the Communication Speed (Baud Rate)
a) Base Speed 115,200
b) Data Send Speed 115,200

⑥ START
- Even if you click "START" button, sometimes "Communication Error" may come out one to twice, and download may fail.
  In this case, please click "START" again.
- Other factors can be considerd if download fails 3 times or more.
- And it takes about 20 minutes for updating the firmware.

* TUNERCON and IR con program is not downloaded by this way, so do disc-download for TUNERCON and IR con.

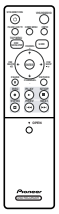


7.1.4 VIDEO ADJUSTMENT FOR SPECIFIC AREA

[Purposes]

Depending on the area, if a flicker may appear in a picture received by the tuner, it can be corrected or reduced with this setting.

[Tools to be used]



Remote control unit supplied with the unit (07660ML010)

Remote control unit for servicing (GGF1381)

1. Specific-Channel Setting mode

In this mode, specific settings can be made for up to 12 channels.
For channels that do not have specific settings, the settings of General Setting mode are applied.

[How to enter this mode]

① Select a channel or line input (L1,L2) on which a specific setting is to be made.
② Press the ESC then CHP/TIM keys on the remote control unit for servicing. "General Setting mode" is displayed.
③ Press the DIG/ANA key in General Setting mode. Specific-Channel Setting mode is entered.

[How to exit] Press the ESC key on the remote control unit for servicing to return the Normal mode.

[Note] Setting is in effect only during recording/playback stop.

[Setting examples]

The setting examples in Specific-Channel Setting mode are shown below.
For details on each setting item, see "Table 1: Key operations in Specific-Area Setting mode."

[When specific channel setting have NOT been made]

General setting data / Specific channel setting data

```
Specific Area Mode
 Input - [ TUNER ]
 Sync AGC            : ON      *
 H Threshold Level   : 12      *
 V Threshold Level   : 10      *

 EPG EQ              : OFF     *

 RGB Line Mask       : 28      *

Individual setting state
 Input Channel - [    1CH ]
 Sync AGC            : ---
 H Threshold Level   : ------
 V Threshold Level   : ---
```

[When specific channel setting have been made]

```
Specific Area Mode
 Input - [ TUNER ]
 Sync AGC            : ON      *
 H Threshold Level   : 12      *
 V Threshold Level   : 10      *

 EPG EQ              : OFF     *

 RGB Link Mask       : 28      *

Individual setting state
 Input Channel - [    1CH ]
 Sync AGC            : ON      *
 H Threshold Level   : 14
 V Threshold Level   : 7
```

[Tips]

- If a channel that does not have specific settings is displayed, the setting figures are displayed as hyphens (- -).
- If the setting figures are not displayed as hyphens, those settings have been specifically set even if they are identical to the default settings or those of General Setting mode.
- The setting indicated with an asterisk (*) is the default.
- The channels to be indicated for "Input Channel" are as shown below:
  Line inputs: L1,L2
  Tuner channels: Channels received by the tuner (channels to be set in Specific-Channel Setting mode, etc.)

[Tips]

- Indication when the maximum number (12) of channels have individual settings
  If a channel that does not have specific settings is currently selected, the indication will be as shown below, and individual data items cannot be set for that channel. To set individual data items for the currently selected channel, you must clear any specific-channel settings for one or more channels.

```
Specific Area Mode
  Input - [ TUNER ]
  Sync AGC          : ON          *
  H Threshold Level : 12          *
  V Threshold Level : 10          *

  EPG EQ            : OFF         *

  RGB Line Mask     : 28          *

Individual  setting  state
  Sorry !
  You can store only 12 channels
  for Specific Area mode.
```

[H Threshold Level]
The slice level setting for the horizontal(H)-sync separation circuit can be changed. By your changing the slice level, horizontal sync disturbance may be ameliorated. Set the slice level to a value with which the least sync disturbance is seen.

[V Threshold Level]
The slice level setting for the vertical(V)-sync separation circuit can be changed. By your changing the slice level, vertical sync disturbance may be ameliorated. Set the slice level to a value with which the least sync disturbance is seen.

[Receiver sensitivity setting for an electronic program guide (EPG)]
The sensitivity when receiving an electronic program guide can be selected. Set the sensitivity to "High" only if reception is unstable.

2. General Setting mode

[How to enter this mode]

- To shift from Specific-Channel Setting mode:
  Each time the DIG/ANA key is pressed, Specific-Channel Setting mode and General Setting mode are alternately selected.

- To shift from Normal mode (recording/playback stop):
  Press the ESC then CHP/TIM keys.

[How to exit] Press the ESC key to return the normal mode.

[Setting examples]

Show setting example on the General Setting mode screen to the following.
Regarding setting of actual each item, refer to table 1 (key operations in specific-area setting mode).

[General Setting mode screen]

```
Specific Area Mode
  Input - [ TUNER ]
  Sync AGC          : ON          *
  H ThresholdLevel  : 12          *
  V Threshold Level : 10          *

  EPG EQ            : OFF         *

  RGB Line Mask     : 28          *
```

*: Setting is the default.

[Display in General Setting mode when the channel currently displayed has specific settings]

```
Specific Area Mode
  Input - [ TUNER ]
  Sync AGC          : ON          *
  H ThresholdLevel  : 12          *
  V Threshold Level : 10          *

  EPG EQ            : OFF         *

  RGB Line Mask     : 28          *

This channel is set up
  individually.
```

[Tips]

- General Setting mode can be entered only during recording/playback stop.
- The currently selected input mode (TUNER or LINE) is displayed for "Input."
- If L1 or L2 is selected for input, general settings for the line input can be made, and if TUNER is selected, general settings for the tuner input can be made.

Table 1: key operations in specific-Area setting mode (1/2)
Key operations in Specific Area Setting mode of the remote control units are shown in the table below
(the keys are of the remote control unit for servicing unless otherwise stated):

Key	Operation	Switching (*: Default)	Remarks	Used in Specific-Channel Setting mode	Used in General Setting mode
[DIG/ANA]	Switches General setting mode and Specific setting mode.	–	–	○	○
[INPUT SELECT], [CHANNEL +/-] (Remote control unit supplied with this unit)	Switches inputs or channels.	–	–	○	○
[SIDE A], [SIDE B]	Sets SyncAGC.	ON(*) / OFF	ON : The sync level is set to an appropriate value. OFF : Cancel the Sync AGC.	○	○
[Rev ×3], [×3 Fwd]	Sets H Threshold.	0 – 15 (Default : 12)	[Rev ×3] : Decreasing 1 by 1 in the range 0 to 15. (Cyclic operation) [×3 Fwd] : Increasing 1 by 1 in the range 0 to 15. (Cyclic operation)	○	○
[Rev CHAPTER SKIP] [CHAPTER SKIP Fwd]	Sets V Threshold Level.	0 – 15 (Default : 10)	[Rev CHAPTER SKIP] : Decreasing 1 by 1 in the range 0 to 15. (Cyclic operation) [CHAPTER SKIP Fwd] : Increasing 1 by 1 in the range 0 to 15. (Cyclic operation)	○	○

Table 1: key operations in specific-Area setting mode (2/2)

Key	Operation	Switching (*: Default)	Remarks	Used in Specific-Channel Setting mode	Used in General Setting mode
[<<|| STILL STEP], [STILL STEP ||>>]	Sets Line Mask setting at RGB signal is inputted.	22 - 40 (Default: 28)	[<<|| STILL STEP] : Decreasing 1 by 1 in the range 22 to 40. (Cyclic operation) [STILL STEP ||>>] : Increasing 1 by 1 in the range 22 to 40. (Cyclic operation)	×	○
[PLAY]	All channels that have specific setting data will be canceled, and the specific data will be initialized.	–	The General Setting data will not be changed.	○	×
[CLEAR]	Specific-Channel Setting mode: If the currently selected channel has its specific setting, that setting will be canceled. (By canceling the specific setting for that channel, the number of remaining channels that can have specific settings will be increased by one.) General Setting mode: Settings of General Setting mode are initialized.	–	Specific-Channel Setting mode: All specific data are initialized. The General Setting data will not be changed. General Setting mode: All general setting data are reset to default. The specific setting data will not be changed (will be retained).	○	○
[PAUSE]	The specific-channel-setting data for the currently selected channel are reset to default.	–	The General Setting data will not be changed (will be retained).	○	×
[ESC]	To quit Setting mode for a specific area and clear the on-screen display.	–	–	○	○

Notes:
- Each key listed in Table 1 above is active only while the tuner is completely stopped.
- The setting values will not be reset to default even if resetting to the state at the time of shipment is performed.

7.1.5 SERVICE MODE

Overview and purposes

To be used to check the status of the product and to collect the information for failure diagnosis.
The following information to be used for servicing is displayed:
[1] First screen : Version, HDD information, etc.
[2] Second screen : ATA/ATAPI debug screen (Writer information)
[4] Fourth screen : VR-recording-related error logs

Each screen has sublevel screens.

[Note] After entering any Service mode screen, to shift to another Service mode screen, first quit that Service mode screen then enter another Service mode screen.

1. Version information, etc. (First screen)

[Purposes]

To check the versions of the system control computer, TUNER microcomputer, and firmware for the drive, simple measurement of the RF level for the U/V tuner, results of the simple error rate measuremen, HDD information, and OSD Filter setting

[Tools to be used]

Remote control unit for servicing (GGF1381)

Aluminum-coated test disc (GGV1025)

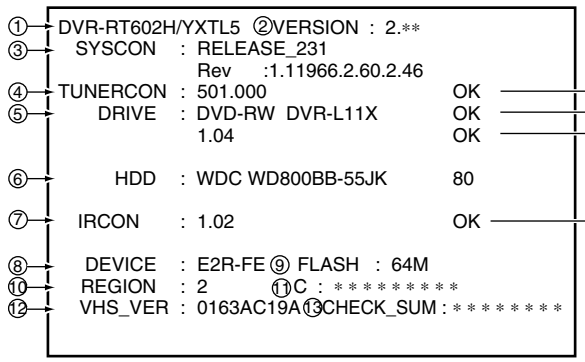
[How to enter] While the GUI screen is not displayed, press the ESC then DISP keys.

How to enter and change subscreens of the first screen: While the first screen is displayed, press the DIG/ANA key repeatedly until your desired subscreen is displayed. The subscreens change

[How to quit] Press the ESC key.

[Description]

(1) First screen



OK : Appropriate version compared with that of the firmware of the system control computer
NG- : The version of the TUNER microcomputer is older.
Measures to be taken:
• Download the firmware.

OK : The appropriate drive is mounted.
NG : An inappropriate drive is mounted.
Measures to be taken: Download the firmware.

OK : Appropriate version compared with that of the firmware of the system control computer
NG- : The version of the drive microcomputer is older.
Measures to be taken: Download the firmware.

OK : Appropriate version of the IRCON (when operated by IR u-com)
NG+ : The version of the drive IR blaster computer is advanced.
Measures to be taken: Download the firmware.
NG- : The version of the IR blaster microcomputer is older.
Measures to be taken: Download the firmware.

① Model name/destination
② Version of the recorder software
③ Revision No. of the system-control computer software
④ Version No. of the tuner microcomputer
Result of the combination ckeck with system u-com
⑤ Information on the built-in drive
(Model name, version No., model type)
⑥ Data of the built-in HDD, capacity of the HDD
⑦ IR Braster u-com information
⑧ DEVICE information (EMMA type, ES No.)
⑨ FLASH ROM information
⑩ Region No.
⑪ CPRM information (CPRM key No.)
⑫ Version No. of the VHS microcomputer
⑬ Check_SUM information of VHS initial setting

• Details on HDD data are described below:

HDD : WDC10234564 # 160

- Capacity of the HDD (unit: Gbytes)
- HDD identification error indication
- Name of manufacturer, part No. by manufacturer

If any abnormality exists in HDD connection, the indications shown in Table 1 below are displayed.

Table 1: HDD recognition status represented by the HDD data display

HDD identification conditions	Example of HDD data to be displayed	Remarks
Failure in physical identification of HDD (no connection, defective HDD, interface error)	Blank space	• Check the connection to the ATA connector. • Replace the ATA flexible cable and connector. • Replace the HDD. • Replace the resistor in the ATA communication line.
Physical identification of HDD possible, but not identified (CPRM ID is not input.)	WDC 10234564 # 160	• Input the CPRM ID.
Physical identification of HDD possible, HDD identified, but failure in logical formatting	WDC 10234564 ! 160	"!" represents an HDD-recognition error. • Initialize the HDD or erase all titles.
Physical identification of HDD possible, HDD identified, and correct logical formatting (HDD correctly identified)	WDC 10234564 160	

If an error indication in the HDD data does not disappear even after the above measures were taken, refer to another sheet of "HDD Service Mode."

(2) Simple diagnosis of the RF level (Subscreen 1)

[Purposes] To check the RF signal of the U/V tuner by checking the input frequency difference and AGC voltage in this debug mode

[How to enter] While the User Setting display is displayed, press the ESC, DISP, then DIG/ANA keys, in that order.

[How to quit] Press the ESC key.

[Description]

```
DVR-RT602H/YXTL5     VERSION : 2. **
  SYSCON   : RELEASE_***
             Rev     :1.******
TUNERCON   : 501.000                 OK
    DRIVE  : DVD-RW DVR-L11X         OK
             1.04                    OK

     HDD   : WDC WD800BB-55JK        80

  DEVICE   : E2R-FE     FLASH : 64M
  REGION   : 2          C : *********
  VHS_VER  : 0163AC19A  CHECK_SUM : ********

  Input CH : ** ch   <-- Input channel
  AGC Volt : **** mV <-- AGC voltage
```

Subscreen 1

1) AGC voltage (AGC Volt)

The gain controlled by the tuner is monitored to infer the input electric field intensity.
(The accuracy of inference differs depending on the product.)

	Field Intensity	AGC VOL
Intense field area (Clear image)	70 dBμ or more	3100 mV or less
Less intense field area (Noise may be generated.)	50 dBμ or more 70 dBμ or less	3100 - 4400mV
Weak field area (Much noise. EPG/VPS/PDC sometimes cannot be obtained.)	30 dBμ or more 50 dBμ or less	4400 mV or more (It is unable to discriminate under the weak field area.)
Very weak field area (Image damaged. EPG/VPS/PDC cannot be obtained.)	30 dBμ or less	4400 mV or more (It is unable to discriminate.)

Tips:
For good reception, the field intensity must be 50 dBμ or more (AGC Volt 4400 mV or less).
For accurate measurement, use a field intensity meter.

(3) Simple Error Rate Measurement (Subscreen 2)

[How to enter]
- While the User Operation screen is displayed, press the [ESC] then [DISP] keys, then the [DIG/ANA] key twice, in that order.
- While subscreen 1 of the first screen is displayed, press the [DIG/ANA] key.

[How to quit] Press the [ESC] key.

[Measurement procedures]

① Display subscreen 2.
② Load the Test disc (GGV1025).
③ Judge the results of the error rate measurement by referring to Table 1 on page 89.

Subscreen 2

[Tips]

During VR mode playback, the average value of the past 10 VOBUs is displayed. During DVD-Video or Video mode playback, the average value of the past 256 sectors is displayed.
During VR mode playback, the speed ratio of the drive (/: normal, no indication: double speed) is also displayed.

Table 1: Thresholds when determining OK or Error

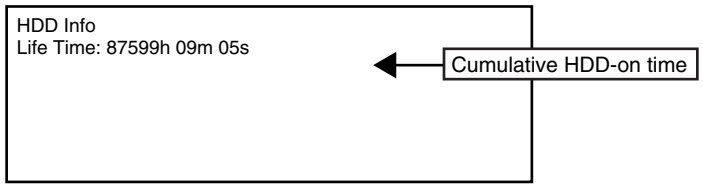
Disc type	Reference value
DVD-VIDEO	8.0×10^{-4}
DVD-R	1.0×10^{-3}
DVD-RW	1.0×10^{-3}
DVD+R	1.0×10^{-3}
DVD+RW	1.0×10^{-3}
DVD-RAM	1.0×10^{-3}
DVD ± R DL	L0 : 1.0×10^{-3} L1 : 3.3×10^{-3}

(4) HDD information (Subscreen 3)

[How to enter]
- While the User Operation screen is displayed, press the ESC then DISP keys, then the DIG/ANA key three times, in that order.
- While subscreen 2 of the first screen is displayed, press the DIG/ANA key.

[How to quit] Press the ESC key.

[Mode description]



Subscreen 3

[Tips]

- **How the data on cumulative HDD-on time are processed in memory**

  Storage place:
  FLASH ROM

  Timing of referring to the data on cumulative HDD-on time:
  When the power is turned on, fails, the FLASH ROM is referred to.

  Timing of updating the data on cumulative HDD-on time:
  While the HDD is on, the data on cumulative HDD-on time in the RAM is updated every 3 seconds, and every time updating is executed the data are stored in the Backup SRAM. When the power is turned off, the data are stored in the FLASH ROM.

- **How to clear the data on cumulative HDD-on time**

  FLASH ROM:
  When the HDD Identification Setting is performed, the data on cumulative HDD-on time are automatically cleared. The HDD Identification Setting is automatically performed when the CPRM setting is performed on the CPRM setting screen (to display the CPRM setting screen, press the ESC then the STEREO keys).

  Notes:
  - The data on cumulative HDD-on time are not cleared when resetting to factory-preset values is performed.
  - The data on cumulative HDD-on time are not cleared when the system-control computer software is downloaded.

(5) OSD FILTER SETTING (SUB screen 4)

[Purpose] Depending on the monitor used, the character flicker on the OSD may stand out.
If a system, such as charavter flicker, appears on the monitor, select the filter response.

[Tools to be used]

Remote control unit for servicing
(GGF1381)

[How to enter]
- While the User Operation screen is displayed, press the ESC then DISP keys, then the DIG/ANA key four times, in that order.
- While subscreen 3 of the first screen is displayed, press the DIG/ANA key.

[How to quit] Press the ESC key.

[Setting procedures]

① Display subscreen 4.
② Select the setting from the key operation table.

OSD Filter Setting

OSD FILTER : 4

Subscreen 4

[Tips]

As the setting value becomes greater, jitter is reduced on a CRT display. However, as lines for characters appear thick, complex characters may become difficult to read. On the contrary, as the setting value becomes smaller, jitter increases on a CRT display. However, as lines for characters become sharper, complex characters become more legible.

Note: Use the remote control unit for servicing.
Note: A new setting becomes active as soon as it is made. As a new setting is stored in nonvolatile memory, it will be retrieved when the unit it turned on the next time.
Note: After the factory-preset values are downloaded, the setting value for the OSD Filter will be the default value (4).

[(Table 2) Key operation of OSD Filter setting]

Key	Operation	Setting value	Remarks
[Rev x 3], [SPEED+] [x 3 Fwd], [SPEED-]	Changing the setting value for the OSD Filter	0 - 4 (Default value: 4)	[Rev x 3], [SPEED+] : The setting value increases by 1. [x 3 Fwd], [SPEED-] : The setting value decreases by 1.
[CLEAR]	The setting value is reset to default.	–	
[ESC]	To exit the OSD Filter Setting and clear the screen (Appears the tuner screen.)	–	–

2. ATA/ATAPI Debug Screen (Second screen)

[Purposes]

To be used as a rough guide to judge whether the pickup unit is all right or not

- Dirt on the pickup lens
- Degradation of the laser diodes for reading CDs and reading/writing to/from DVDs

[Tools to be used]

Remote control unit for servicing (GGF1381)

Aluminum-coated test disc (GGV1025)

[How to enter]

- While the User Operation display is displayed, press the ESC, DISP, then 2 keys, in that order.
- While any subscreen of the second screen is displayed, press the DIG/ANA key repeatedly. The subscreens change cyclically.

[How to quit] Press the ESC key.

(1) Writer maintenance information of ATA/ATAPI DEBUG OSD (Subscreen 3)

[How to enter]

- While the User Operation screen is displayed, press the ESC, DISP then 2 keys, then the DIG/ANA key twice, in that order.

[How to quit] Press the ESC key.

[Procedures] Update the display by pressing the SEARCH key while subscreen 3 is displayed.

```
ATA/ATAPI  Writer MaintenanceInfo
①→Power ON      00 00 00 0000 00000000
  0102:56       01 00 00 0000 00000000
  DVD           02 00 00 0000 00000000
②→R0053:48      03 00 00 0000 00000000
③→W0022:16      04 00 00 0000 00000000
  CD            05 00 00 0000 00000000
④→R0034:04      06 00 00 0000 00000000
⑤→W0000:00      07 00 00 0000 00000000
                                  00-00
```

Error log for the Writer (Not for Service)

① Power-on time/cumulative power-on time
② Duration of emission of the laser diode (LD) for DVD-R/DVD while reading
③ Duration of emission of the LD for DVD-W/DVD while writing
④ Duration of emission of the LD for CD-R/CD while reading
⑤ Duration of emission of the LD for CD-W/CD while writing (This function is not used for this model.)

② If the total hours of duration of emission of the laser diode (LD) for DVDs while reading ② and that of emission of the LD for DVDs while writing ③ exceed 4,700 hours, the LDs may be degraded. Perform an LD degradation judgment, using subscreen 4.

[Tips]

MTTF hours for each LD
DVD: 4,700 hours
CD: 11,000 hours
The ATA/ATAPI Writer Maintenance Info is obtained each time the power is turned on. Thereafter, the data on the subscreen is updated each time the SEARCH key is pressed (the updating command is sent) while this subscreen is displayed. Care must be taken when updating this subscreen, because an undesired command is inserted if it is executed while recording, etc.
[Note on lighting time data for each LD]
Since data on lighting time of each laser diode (LD) are stored in the flash ROM on the MAIN Assy, after the MAIN Assy is replaced, the data will be cleared. However, after the LOADER Assy is replaced, data on lighting time of each LD will be retained in the MAIN Assy. Therefore, before either the MAIN Assy or LOADER Assy is to be replaced, it is recommended that you write down the lighting time data.

(2) LD degration judgment of ATA/ATAPI DEBUG OSD (Subscreen 4)

[How to enter]
- While the User Operation screen is displayed, press the ESC, DISP then 2 keys, then the DIG/ANA key three times, in that order.

[How to quit] Press the ESC key.

[Notes]
- For correct measurement of items ① to ④ indicated in the display below, leave the unit at room temperature (25°C) for a while before turning it on, and do not load a disc.
- For RF measurement (item ⑤), it is recommended to use the Test disc (GGV1025).
  As the RF level differs depending on the characteristics of the pickup from product to product, it cannot be used for judging degradation of the LD. Use the RF level as a rough guide to know the difference between before and after lens cleaning.

[Procedures] To update the value for each item, press the SEARCH key while subscreen 4 is displayed.
For details on each item and the conditions of updating the values, see Table 2 below.

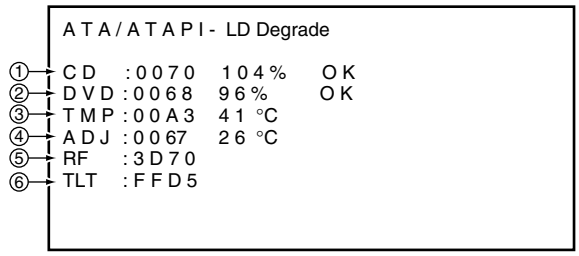


Table 2: Description of each item and conditions for updating data

No.	Item	Description	Conditions for updating by pressing the SEARCH key
①	CD	Degradation judgment of LD for CD. Regarded as NG when the value is 120% or higher (same standard as for the PC drive)	No disc inserted in the disc tray
②	DVD	Degradation judgment of LD for DVD. Regarded as NG when the value is 120% or higher (same standard as for the PC drive)	No disc inserted in the disc tray
③	TMP	Current temperature inside the Writer	No disc inserted in the disc tray
④	ADJ	Temperature (approx. 25°C) inside the Writer during adjustment	No disc inserted in the disc tray
⑤	RF	RF level (16-bit data, proportional calculation performed using the actual RF level value with 2.5 V = 0xFFFF as the maximum value, displayed in 4-digit hexadecimal)	During playback of disc medium (GGV1025)
⑥	TLT	Writer adjustment data for straight (non-HDD) model (FFFF is diplayed when the writer is not adjusted.)	No condition

If the results of degradation of the LDs for CDs and DVDs are both NG, replace the drive.

3. VR-Recording-Related Error Logs (Fourth screen)

[Purposes]

To roughly determine in which category shown below a symptom that is difficult to reproduce belongs.
For details on the categories of error logs displayed, see "Table 1: Description of VR-recording-related errors."

- Errors related to the MPEG Encoder
- Errors related to the drive system
- Errors related to copying
- Errors related to others
- Errors related to the HDD

[Tool to be used]

Remote control unit for servicing
(GGF1381)

[How to enter]

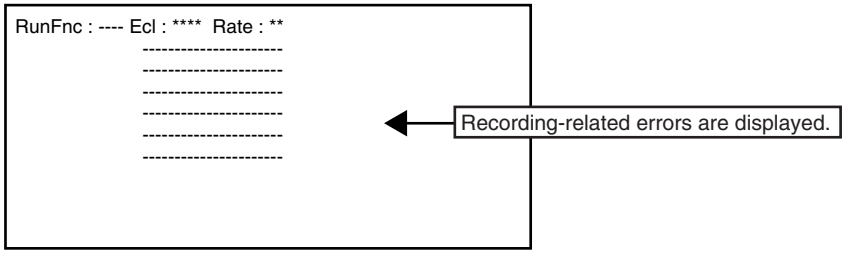
- While the User Operation display is displayed, press the [ESC], [DISP], then [4] keys, in that order.
- While any subscreen of the fourth screen is displayed, press the [DIG/ANA] key repeatedly.
  The subscreens change cyclically.

[How to quit] Press the [ESC] key.

[Description of each subscreen]

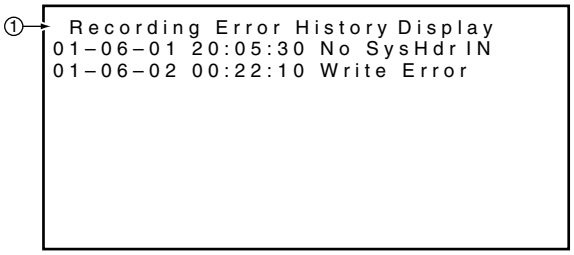
(1) VR-Recording-Related Error Logs (Subscreen 1)

- Errors related to recording are displayed on the lines "Rec Err:," as shown below.
  For details on errors, see "Table 1: Description of VR-recording-related errors."



(2) Subscreen 2 and 3 (These subscreens are not for service use.)

(3) VR-Recording-Related Error Logs (Subscreen 4)



① There are two error-log screens, on which up to 9 logs per screen are displayed.
(generation time [year-month-day, hour:minute:second], error data in simplified description)

[Tips]

- The two error-log screens can be switched by pressing the [SPEED+] or [SPEED-] key.
- For details on error messages, see Table 1 "Description of VR-recording-related errors".

(4) Subscreen 5 to 11 (These subscreens are not for service use.)

Table 1: Description of VR-recording-related errors

Any error message marked with * is displayed "RecErr : ---------" on the Subscreen 1 of the fourth screen.

● Error related to MPEG Encoder

Error Message	Description
AVEnc Hang	AVEncoder failed
IN Encode *	Changes cannot be made in the process of encoding
No SysHdr IN	System packet is not input periodically
Stm Start NG	Failure to start encoding (reasons not clear)
Stream NG	Inappropriate input stream data
Strm Start NG	Timeout waiting for system packet input at the beginning

● Error related to Drive system

In a case of an error in the drive system, scratches or dirt on a disc, or a problem of the drive itself (dirty pickup) may be suspected.

Error Message	Description
Bdr Cls NG	Close Border failed
Bdr Opn NG	Open Border failed
BUF Overflow	Overflow of the Stream Buffer
CLS Rzon Fail	Video Mode Close Rzone failure
Drive Hang	The Drive is hung up.
Drv Err	General error of the drive
Drv Hard Err	Abnormality in the drive hardware or firmware
Drv TimeOut	Timeout waiting for drive operation
Fail Repair	Repair failed
Format NG	Format failed
May Be V mode	Although TMP_VMGI is not written, it may be Video Mode disc.
Mech No Res	No response from the mechanical-control computer
MKB Invalid	MKB reading error
NWA Exhaust	NWA surpassed and impossible to use
OPC NG	OPC failed
PCA Full	PCA has been used up.
Read Err	Reading failed, ECC failed, etc.
ReadOnly DISC *	Because some data are invalid, data cannot be written
RMA Full	RMA has been used up.
Rzn Cls NG	Close RZone failed
Rzn Rpr NG	Repair RZone failed
Rzn Rsv NG	Reserve RZone failed
TMP-VMG WrErr	Video Mode TMP VMGI Write Error
VTSI_B Wr Err	Video Mode VTSI BUP Write Error
VTSI_B2 Wr Err	Video Mode VTSI BUP Write Error (After Layer Change)
VTSI Wr Err	Video Mode VTSI Write Error
VTSI2 Wr Err	Video Mode VTSI Write Error (After Layer Change)
Write Err	The Drive failed to write and could not be recovered.
May Be PVR	May be +VR disc, but no RSAT
V Final fail	Abnormal process occurred when finalizing Video mode
DLVR trace NG	Close Rzone failed at dual layer disc

RSAT : Reserved Space Allocation Table

● Error related to Dubbing

Error Message	Description
H2D CP SomeNG	Other NG HDD →DVD copy
Mem get NG	Video Mode Copy Memory has not ensured.
Strm TransfNG	Video Mode Copy Stream Transfer NG
Tracon Trn NG	Video Mode Copy Tracon tranfer has not been completed.
VC Cell Max	Maximum number for Video Mode copy Cells exceeded
VC CopyCancel	Video Mode Copy Copy Cancel
VC FlushC NG	Video Mode Copy Flush Cache NG
VC HDD C Err	Obtaining Video Mode Copy HDD Cell information failed
VC HDD Inf NG	No information on Video Mode Copy HDD
VC HDD Info NG	Format failed
VC Idling NG	Video Mode Copy idling NG
VC Pck Anl NG	Analizing Video Mode Copy Pack failed

● Error related to Dubbing (continued)

Error Message	Description
VC Transf Stp	Video Mode Copy Transfer Stop
VC TSO BLK NG	Video Mode Copy TSO Block transfer has not been completed.
VC VOBU SizeE	Video Mode Copy VOBU Size NG
V Rsv RzoneNG	Video Mode Copy Reserve Rzone failed
V2H APP FL NG	VR → HDD APP FLG is OFF
V2H Aud Ch NG	VR →HDD Audio Channel NG
V2H Aud Md NG	VR →HDD Audio Mode NG
V2H Aud Stm N	VR →HDD Audio Stream number NG
V2H SRC Prot	VR →HDD copy prohibitted material
V2H Unknown	VR →HDD other NG
V2H VOBU TMNG	VR →HDD Play back time of each VOBU is different
V2H V Reso NG	VR →HDD Video resolution NG
H2D CP NoSpac	HDD →DVD insufficient free space for copy
H2D TO HDDRD	HDD →DVD (VR) TimeOut at HDD playing side
H2D TO SPRO	HDD →DVD (VR) TimeOut at internal processing
H2D TO DVDWR	HDD →DVD (VR) TimeOut at HDD recording side

● Other Errors

Error Message	Description
Abort *	Cancellation
Already open	Extension file is already opened.
BK BATT Down	Backup RAM data has been erased.
BK FSYS Dirty	Backup RAM data has not been wrtten on the File Sys.
BUG	Some bugs
BusReset Done	Bus Reset has been excecuted.
Cell Close NG	Cell Close NG
CPRM IC NG	Inappropriate CPRM IC
Dir Depth Err	Tree of Directory is too deep.
Disc Full	No further data can be written because the disc is full.
DRAM CLR Err	Video Mode DRAM (Stream Buffer) Clear failure
DRAM NG	Abnormality in access to the Work DRAM
Drive Destroy	The drive has crashed.
EncModul Hang	Encoder routine is hung up.
F Alrdy Exst	Extension file is already exist.
File cansel	Extension file is canseled.
FileNot Exist	Extension file is not exist.
Format Excec	Formatting has been executed.
Invalid Disc *	The disc cannot be recognized.
Invalid Param *	Invalid parameter
Invalid TMVMG	Invalid TMP_VMGI content
Invalid UDF *	Invalid UDF content
Invalid VMG *	Invalid VMG content
Invalid VTSI	VTSI information of +VR is unusual.
Irr Action *	Incorrect action
MKB REVOKED	Error in gaining data
Limit Over *	Standard maximum limit exceeded
No More Info *	No more space in the internal work-management area
No Permission *	No permission to write to the disc
No Video	No video input (not locked)
Now Busy *	In the process of the emergency processing
NV Pck DMA Er	Inappropriate NaviPack DMA
NV Pck MK Err	Error in creating NaviPack
Ourob Strm NG	Inappropriate stream data to the Ouroboros input
Over Heat	Abnormal temperatute
PARAM NO ACCP	Recording parameter is not matched.
Process Over	Process is overfull.
Protect Src *	Source to be recorded is copy-protected.
Rec Pause *	No operation permitted during recording pause
Relocation Do	VR-recording data was relocated

● Other Errors (continued)

Error Message	Description
Repair Excec	Repairing has been executed.
Something *	Undetermined error
SRAM NG	Abnormality in access to the backup work SRAM
Status NG *	Abnormality in change of statuses
SW PVR	Switch to +VR playback process
SW Vpb mode *	Switching to video playback routine is required.
SW Vrec mode *	Switching to video recording routine is required.
Unmatch Stamp *	Impossible to modify because of nonmatching time stamp
VBR-SRAM NG	Abnormality in VBR SRAM
V Categ ID NG	Inappropriate Category ID
V Cate Inf NG	Inappropriate Category information
V Ext MAX Ovr	Count Max exceeded
V ExtToo Big	The extension file is too large.
V Ext TY NG	Type NG
Virgin DISC	Virgin Disc
VOBU Info NG	Inappropriate VOBU information
WaterMark Det	Watermark detected
WM Cracked	WM Cracked
Param Short	Editting Error (Clear A-B)
Invalid VRMI	Information of +VR is NG. (VRMI)

● Error related to HDD

Error Message	Description
Do nothing	Do nothing for demand.
ESFSYS CORUPT	easyfsys error
ESFSYS INIT	easyfsys initializing
HDD Buff High	High-level process executed for the HDD Buffer
HDD DEF DONE	HDD deflag finished
HDD DEF ERR	HDD deflag error
HDD Destroy	HDD is not recognized on the bus.
HDD INFO BAD	Incorrect HDD Management Data
HDD Initialize	HDD initialized
HDD IRRG POFF	Abnormal power off
HDD MBR NG	Inconsistent MBR data
HDDReset Done	HDD Reset executed
HDD ROMSUM NG	Rom-code check sum NG
HDD SIG NG	Inconsistent HDD Management Data Magic
HDD SMART NG	Inappropriate HDD SMART
HDD Trans Err	DMA error in HDD copy transfer
HDD unauthor	Inconsistent HDD serial No.
HDD Zero WR	MBR was witten
Task No Activ	Task has not been activated.
TT Rec Over	Title recording time full
HDD WRONG TGT	Invalid HDD target No. is directed.
extHDD Ignore	External HDD is dismounted.
HDD PFile NG	Program file installed in HDD is NG.
HDD DEL TT	Delete the title by HDD recovery.
HDD DEL PL	Delete the dubbing list by HDD recovery.
HDD DEL OC TT	Delete the title moving on the way inside HDD

● No Error

Error Message	Description
Non Err *	Normal

Abbreviations:

ECC = 4 byte Code for Error Correction
UDF = Universal Disc Format
PCA = Power Calibration Area
OPC = Optical Power Control
NWA = Next Writable Address
VMG = Video Manager
RMA = Recording Management Area
MKB = Media Key Block
TMP_VMGI = Temporary Video Manager Information
Border = from Lead-in to Lead-out

7.1.6 EPG SERVICE MODE

[Purposes]

Reasons for the following malfunctions can be inferred by checking the conditions for obtaining the past EPG data:

① EPG data cannot be obtained.
② Some EPG data obtained are missing.

[Tool to be used]

Remote control unit for servicing
(GGF1381)

[How to enter] • Press the [ESC], [DISP], [7] keys, in that order.

[How to quit] Press the [ESC] key.

[Description of the mode]

1. Summary screen

```
    0         1         2         3         4
    01234567890123456789012345678901234567890123456789
00  (EPG EURO)
01  Next Data  Download Time : 14:00
02             Duration     : 01h30m
03  Gemster Data  Fail Count : 00
04
05
06
07  EPG Data Receive Err Summary
08  Date  Start  End  MD  CH  RcvPkt   TotalErr
09  03/31 13:00 13:30 DL  03  001853   000000
10  03/31 09:00 11:00 DL  03  001192   000000
11  03/31 08:00 08:05 HS  --  000645   000000
12  03/31 00:00 00:00           000000   000000
13  03/31 00:00 00:00           000000   000000
14  03/31 00:00 00:00           000000   000000
```

Lines 01-02	The next download starting time for the EPG data is displayed. Next Data Download Time: Starting time Duration: Duration required for acquiring the EPG data
Lines 03	The Gemster EPG data cannot be found. Number times of Host Scan and Schedule Download, DT models only (Always 00 except DT model)
Lines 09-14	The 6 latest error logs when EPG data were received are displayed, with the latest one at the top.

Date	: Month/day when reception started
Start	: Time when reception started
End	: Time when reception ended
MD	: Method for acquiring the EPG data (HS: Host scanning process, DL: Downloading process of the EPG data)
CH	: Data-receiving channel
RcvPkt	: Total number of received packages. A number 999,999 or greater is displayed as "999999."
Total Err	: Total errors during reception. The sum of Hamming Err, Trans Err and InvLine Err numbers indicated on the Detail screen. A number 999,999 or greater is displayed as "999999."

[Tips] In a case where only "HS" is displayed in the MD column of the logs, the host channel has not been found. It is necessary to check the country and postal-code settings in the user settings.

2. Detail screen

[How to enter] Press the DIG/ANA key while the Summary screen is displayed. Up to 6 detail screens (1 to 6) are displayed, one each time the DIG/ANA key is pressed. Each detail screen 1 to 6 corresponds with the EPG reception error logs from the top on the Summary screen.

[How to quit] Press the ESC key.

[Description of the Detail screens]

```
    0         1         2         3         4
    01234567890123456789012345678901234567890123456789
00  (EPG EURO)
01  EPG Data Receive Err Details - 1
02
03  Date : 03/31
04  Start Time : 13:00   END Time   : 13:30
05  Host CH    : 03      P-ON Kind  : Download
06
07  Data Receive Part   Total Err  : 000000
08  Pkt Rcv Num  : 001853  Pkt Snd Num : 001853
09  Inv Line Err : 000000
10  Slice Cont : Auto EQ : OFF LV : -h
11
12  Temporary  Buffer  Information
13  Pool  Num   : 000000  Max  Store  : 000000
14  Discard Pkt  : 000000  Use  Num   : 000000
```

Line	Display item	Description	Remarks
Line 01	EPG Data Receive Err Details-X	The rightmost figure represents the number of the current detail screen. This number corresponds to the order of the EPG reception error log from the top.	
Lines 03-05, Reception conditions	Date Start Time END Time Host CH P-ON Kind	: Month/day when reception started : Time when reception started : Time when reception ended : Data-receiving channel : Methods for acquiring the EPG data (host scanning and downloading)	Only during initialization, host scanning is automatically executed to find the host broadcast.
Lines 07-10, details on errors during reception	Total Err	: Total numbers of errors during reception. The total number of Hamming Err, Trans Err and InvLine Err indicated on the Detail screen. A number 999,999 or greater is displayed as "999999."	Total Errors: If the total number of errors reaches two digits or greater, it is likely that EPG data acquisition failed. Display subscreen 1 of the first screen and check the electric field intensity from the AGC level.
	Pkt Rcv Num Pkt Snd Num	: Total number of received packages. A number 999,999 or greater is displayed as "999999." : Total number of packages that were sent to the application program among all the received packages. A number 999,999 or greater is displayed as "999999."	If the total number of received packages is 0, it is likely that the country and postal-code settings are wrong.
	InvLine Err	: Total number of errors that were generated by receiving data from invalid lines. A number 999,999 or greater is displayed as "999999."	
	Slice Cont	: Slice level control Auto-Tu Con, Manual - Syscon.	
	EQ	: Equalizer setting (ON, OFF)	
	LV	: Slice level (10~30 hex) (Only when the slice Cont is Manual.)	

Note: The data on lines 12-14 are for software development, not for service use.

7.1.7 AGING MODE

[Purposes]

If symptoms regarding recording/playback of discs and/or the HDD that your customer claimed are difficult to reproduce, they can be reproduced with a long-time test in Aging mode.

[Tools to be used]

Remote control unit for servicing (GGF1381)

Remote control unit supplied with the unit (07660ML010)

Commercially available, recordable DVD-R/+R and DVD-RW/+RW/-RAM discs

[Notes]

- When aging for the DVD-RW/+RW/-RAM and HDD is executed, all recorded data on them will be erased.
- Commands from the remote control unit are accepted during Aging mode.
- If Aging mode is quit using the ESC key, indications on the FL display will return to normal display.
- Cancel timer settings before entering Aging mode.
- Set the recording rate beforehand. It cannot be changed during Aging mode.

[How to enter]

① Press the DVD key to switch to DVD.
② Load a recordable disc.
③ Select the input function of a recordable source.
④ After disc detection is performed, press the ESC then REP.B, and then PLAY keys on the remote control unit for servicing to enter Aging mode.

[How to quit]

Press the ESC key on the remote control unit for servicing to quit Aging mode and return to Normal mode.

Notes:

- If during recording: Recording is stopped.
- If during playback: Playback is paused.
- If during initialization: The unit stops after initialization is finished. ← (aging for ±RW/-RAM only)
- If the tray is being opened/closed: The unit stops after the tray is opened/closed. ←

[Description of operation] **Aging for the DVD-RW/DVD-R**

Aging for the DVD-RW/+RW/-RAM	Aging for the DVD-R/+R
During Aging mode, the following operations are repeated in the order shown below. ① The tray opens. ② The tray closes. ③ Initialization ④ Recording for 60 minutes ⑤ Playback for 45 minutes <DVD-RW> The initialization process in step 3 follows the setting specified in "Setting of the main unit--Recording--Auto initialization of a DVD-RW." <DVD+RW> The initialization process in step 3 is the same as that described in "Disc setting--Initialization--Initialization of a DVD+RW." <DVD-RAM> In the initialization process in step 3, physical formatting is performed, if required. During Aging, the number of loops is indicated on the FL display, as shown below. [AGING 0001] If an error is generated, the aging operation stops. **Note:** Indications on the FL display are retained, and this information is also retained as an OSD.	During Aging mode, the following operations are repeated in the order shown below. ① The tray opens. ② The tray closes. ③ Recording for 1 minute ④ Recording pause for 6 minutes ⑤ Recording stops. ⑥ Playback for 1 minute ⑦ Playback pause for 6 minutes ⑧ Playback stops. **Note:** A continuous test of the above operations is possible for approximately 23 hours. After ② the tray closes, disc detection is performed, <DVD-R> In step 2, if the disc is judged to have recorded up to 99 titles, the operation stops at that point. <DVD+R> If the disc is judged to have recorded up to 49 titles, the operation stops at that point. On the FL display, the number of loops is retained. On the OSD display, the error indication is retained. During Aging, the number of loops is indicated on the FL display, as shown below. [AGING 0001] If an error is generated, the aging operation stops. **Note:** Indications on the FL display are retained, and this information is also retained as an OSD. **Note:** Recording time depends on the recording rate set. For example, if the recording rate is MN32, only up to 60 titles can be registered. Check the setting for recording rate before performing aging.

[Aging for the HDD]

[How to enter]

① Press the HDD key to switch to HDD.
② Press the ESC key then the REP.B, and then the PLAY keys on the remote control unit for servicing to enter Aging mode.

[How to quit]

Press the ESC key on the remote control unit for servicing to quit Aging mode and return to Normal mode.

Notes:

- If during recording: Recording is stopped.
- If during playback: Playback is paused.
- If during erasure of all memory data from the HDD, the unit stops after all memory data have been erased.

[Description of operation]

During Aging mode, the following operations are repeated in the order shown below.
① Erasure of all the memory data from the HDD
② Recording for 60 minutes
③ Playback for 60 minutes

* *Take caution as all recorded data of the HDD is deleted.*

[Tips]

During Aging, the number of loops is indicated on the FL display, as shown below.
[AGING 0001]

If an error is generated, the aging operation stops.

Note:
Indications on the FL display are retained, and this information is also retained as an OSD.

7.1.8 HDD CHECK MODE

How to diagnose failure of the hard disc drive (HDD)

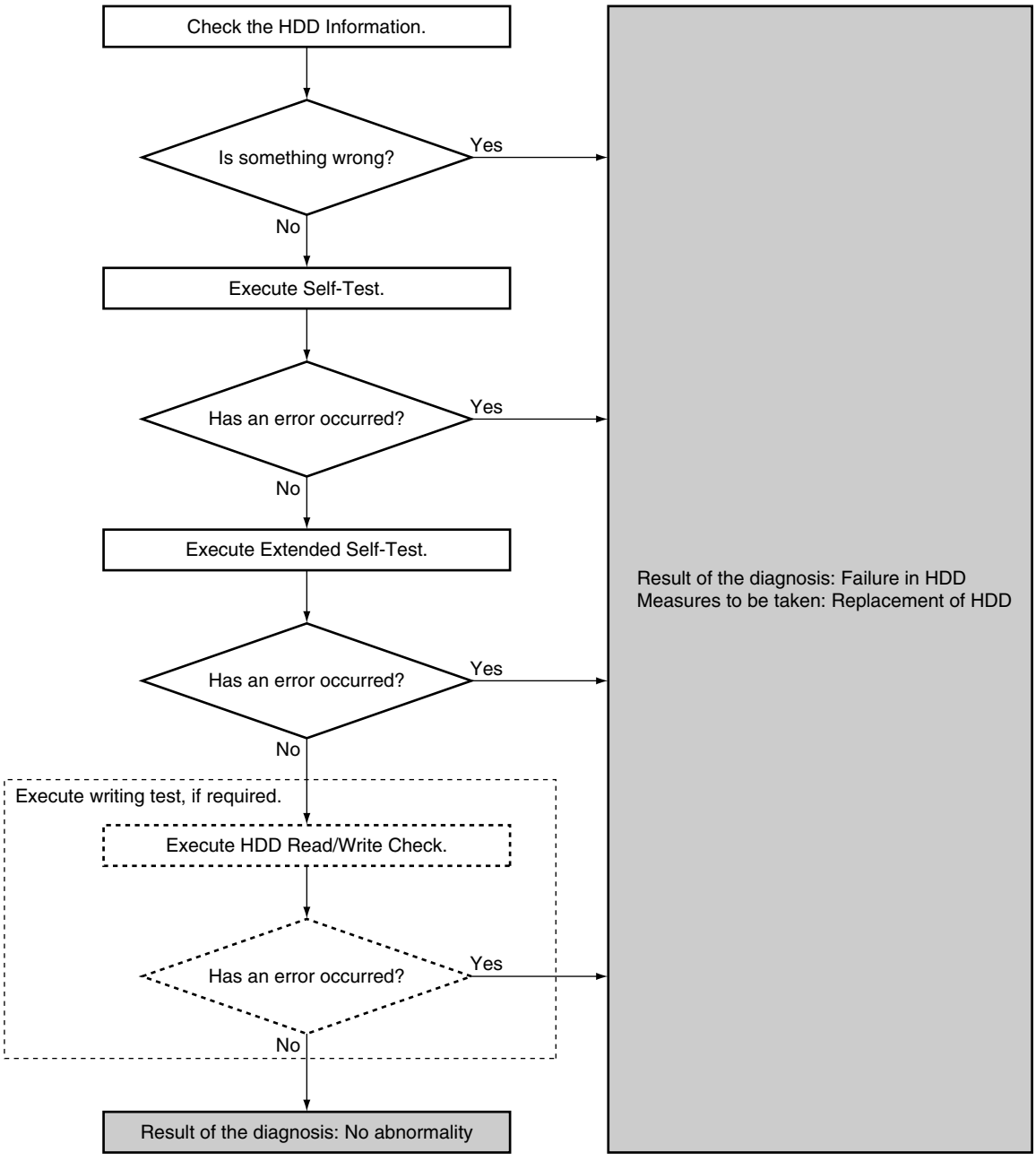
Purpose:
With use of the HDD-diagnostic program contained in the product itself, physical errors on the HDD can be diagnosed. Use this program to diagnose whether or not the HDD is in failure when one of the symptoms indicated below is recognized, or when a failure in the HDD is suspected.

Symptoms of failure in HDD:
(1) HDD Error
(2) Failure in HDD recording or playback
(3) HDD not recognized

Tool to be used:
Remote control unit for servicing (GGF1381)

1. Flow of HDD diagnosis

(1) Flowchart of HDD diagnosis



(2) Overview of the diagnosis items

HDD Information	This is a display for checking the HDD information, such as the model name of the HDD, continuous power-on time, authentication status, and results of the diagnosis on the end of service life.
SELF TEST	This is a simplified diagnosis for the HDD. A serious failure in the HDD can be detected with this test. Time required for testing: Approx. 60 sec.
EXTENDED SELF TEST	This is a reading test across all sectors of the HDD. Data recorded on the HDD will not be erased, because no writing operation is performed. Time required for testing: Approx. 1 hours/80 GB
HDD Read / Write Check	This is a writing, reading, and comparing test across all sectors of the HDD. **All data recorded on the HDD will be erased**, because all the data are to be overwritten. **Be sure to obtain your client's consent beforehand.** Time required for testing: Approx. 3.2 hours/80 GB

2. How to start or terminate the diagnostic program

How to start/terminate the diagnostic program

Use the remote control unit for servicing.

How to start: Press the "ESC", "CX", "0", and "1" keys simultaneously.

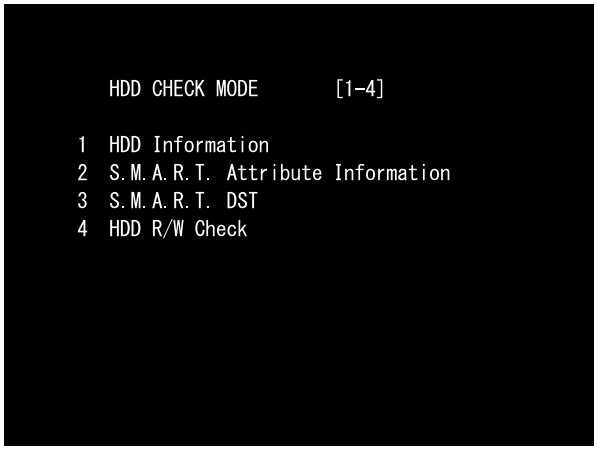
How to terminate: Press the "ESC" key.

Do NOT perform other operations on the unit while the HDD diagnosis is in progress. Although the diagnostic program is designed to function independently from the unit's functions, an operation on the unit during a diagnosis may cause a malfunction.

The status of the unit recommended during diagnosis is as follows: All stop, no timer recording (including auto-recording), and Input selection to L1, L2.

3. Diagnosis procedures

① Display the menu on the screen.
The menu indicated below is displayed when the diagnostic program is started. To enter each mode, press the corresponding key "1"-"4" on the remote control unit for servicing.



Tests to be executed
① HDD Information:
Check of the HDD information
② S.M.A.R.T. DST:
Executing a simplified test or a reading test of all data
③ HDD R/W Check:
Executing a writing/reading test of all data. All data on the HDD will be erased if this test is executed.

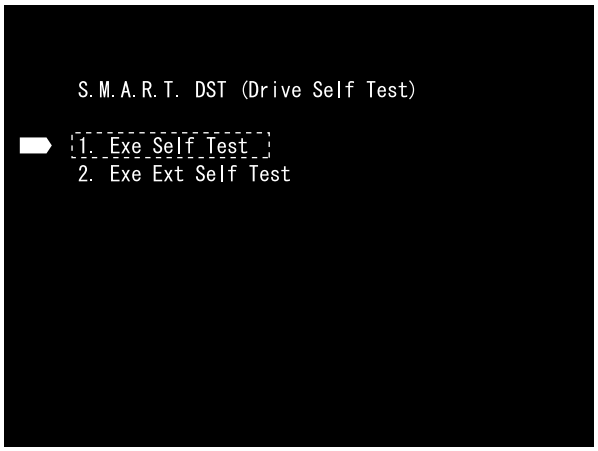
Note: "2. S.M.A.R.T. Attribute . . ." is not to be used.

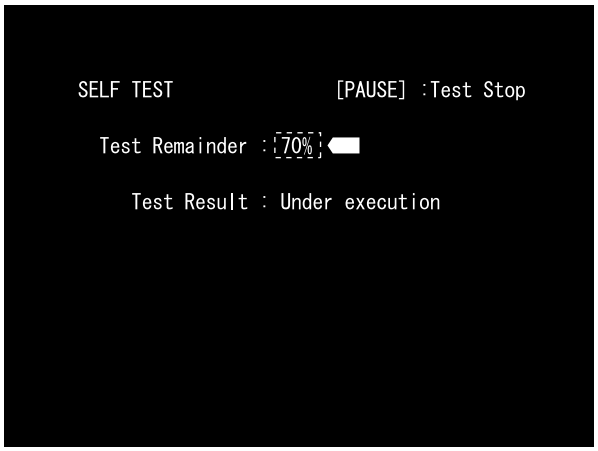
② Check the HDD information.
Press the "1" key on the remote control unit for servicing. Check the following data:
Model: Is the correct model name of the HDD displayed?
Recog. No: Is a positive value displayed?
SMART threshold: Is "not exceeded" displayed?

Detailed description
① Model:
For the correct model name, refer to the display of the unit.
② Recog. No:
Positive value: The HDD has been authenticated.
Negative value: The HDD has not been authenticated.
③ SMART threshold:
exceeded: The HDD has come to the end or near the end of its service life.
not exceeded: The HDD has not reached the end of its service life.

To return to the menu screen, press the "Clear" key.

③ Execute Self-Test.
Press the "3" key on the remote control unit for servicing while the menu screen is displayed.
When the following screen is displayed, press the "1" key to start the Self-Test.



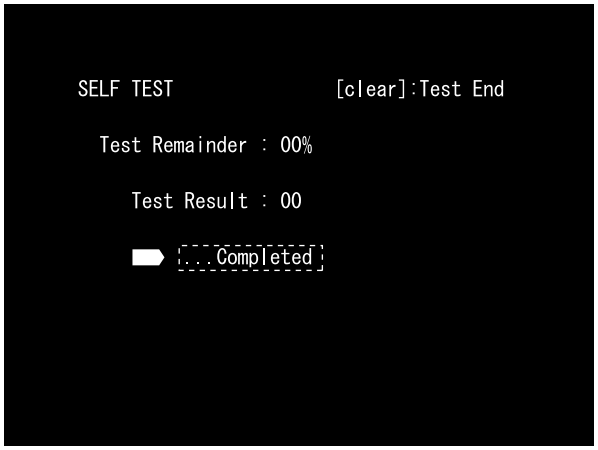


The progress of the test is displayed on the screen. The percentage remaining of the test is displayed on the screen, and the test is terminated when the percentage reaches 00%.
Check whether or not an error has occurred after the test is finished.

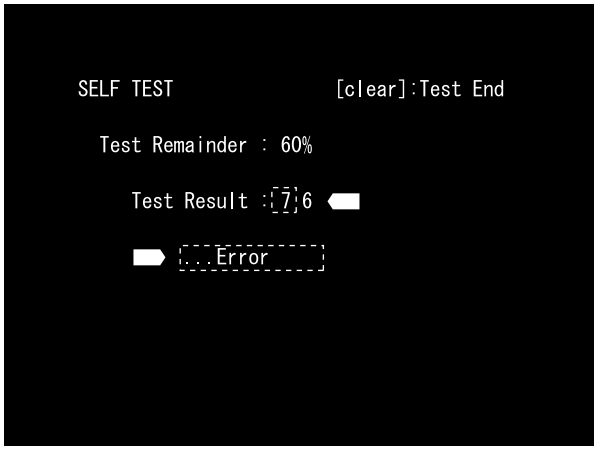
Diagnosis results
- Without an error: ". . . Completed" is displayed.
  Then, proceed to the Extended Self-Test.
- With an error: ". . . Error" is displayed. Look at the number in Test Result.
  If the place value for tens is 1 or 2, execute the Self-Test again.
  If it is from 3 to 7, the HDD must be replaced.

Note: If the result of the second test is the same, replacement of the HDD is required.

Example: No error

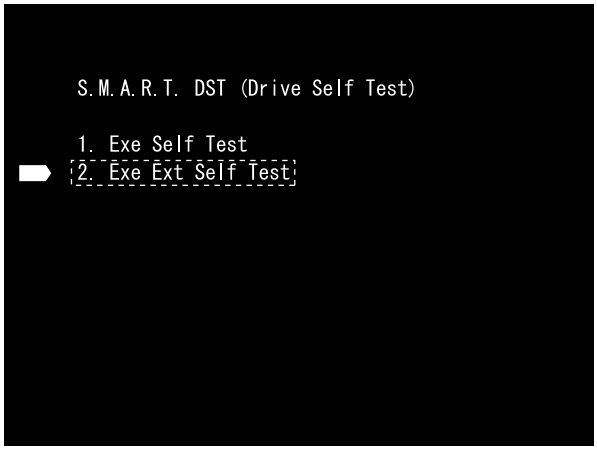


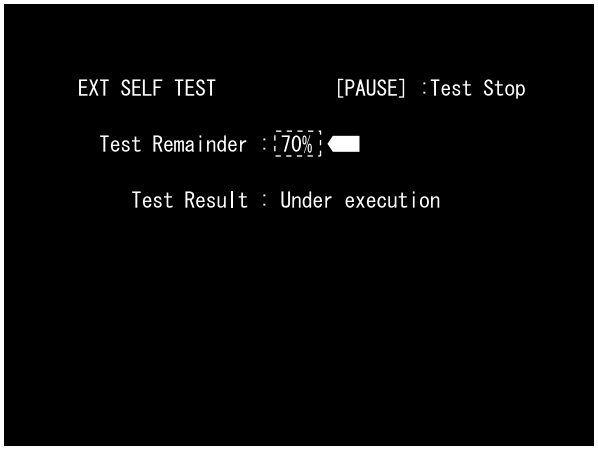
Example: With an error



To return to the menu screen, press the "Clear" key.

④ Execute the Ext (Extended) Self-Test.



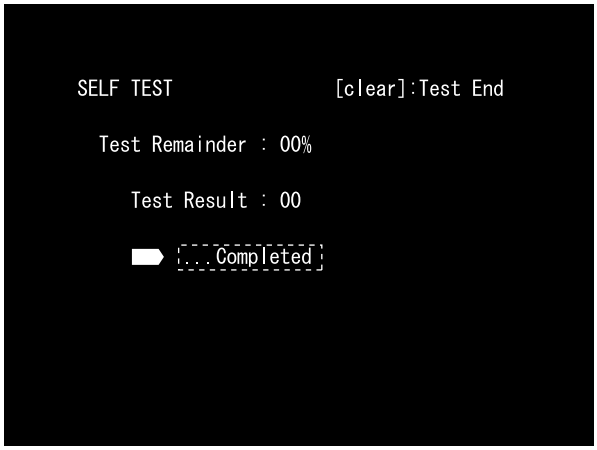


Press the "3" key while the menu screen is displayed, then the "2" key on the remote control unit for servicing. The Extended Self-Test starts. The percentage remaining of the test is displayed on the screen, and the test is terminated when the percentage reaches 00%. Check whether or not an error has occurred after the test is finished.

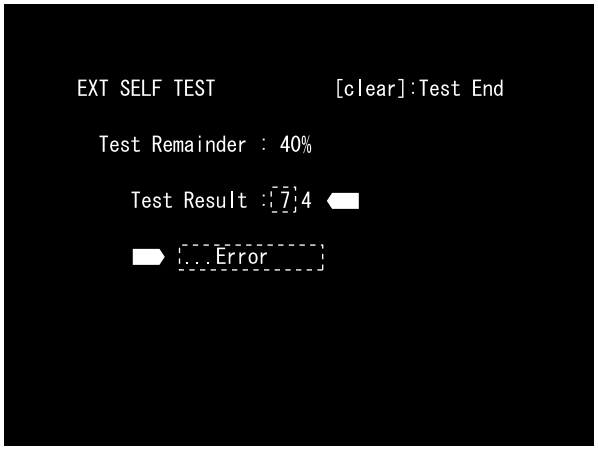
Diagnosis results
- Without an error: ". . . Completed" is displayed.
  If no error occurs up until this stage, HDD operations are normal except for writing operations.
  If the unit has a failure in HDD playback, a block other than the HDD may be in failure.
  If the unit's failure is in HDD recording, however, the next HDD Read/Write Check must be executed to test writing operations.
- With an error: ". . . Error" is displayed.
  Look at the number in Test Result.
  If the place value for tens is 1 or 2, execute the Ext Self-Test again.
  If it is from 3 to 7, the HDD must be replaced.

Note: If the result of the second test is the same, replacement of the HDD is required.

Example: No error

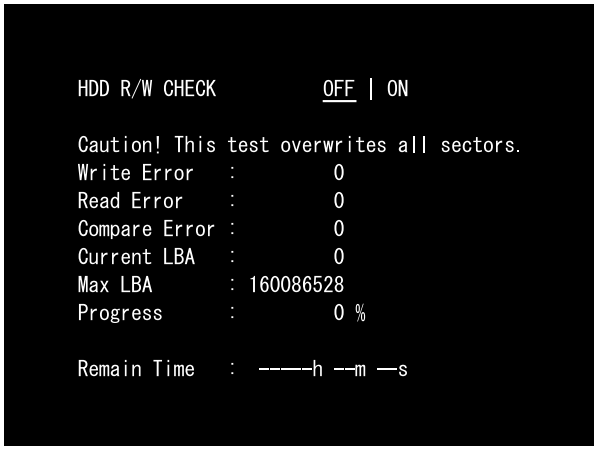


Example: With an error

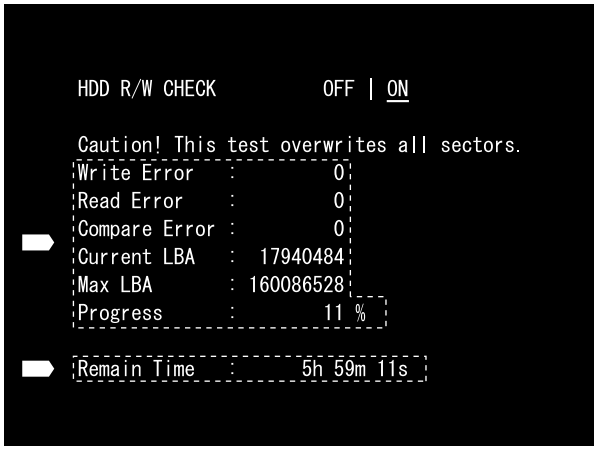


To return to the menu screen, press the "Clear" key.

⑤ Execute the HDD R/W Check.
Before executing this test, **be sure to obtain your client's consent for erasure of HDD data**.
Press the "4" key while the menu screen is displayed then the "SKIP ►►I" key to start the HDD R/W Check.
To stop executing the test (OFF) while it is in progress, press the "SKIP I◄◄" key.



The display on the left indicates the progress of the test.
The percentage of the test progress is displayed on the screen, and the test is finished when the percentage reaches 100%.

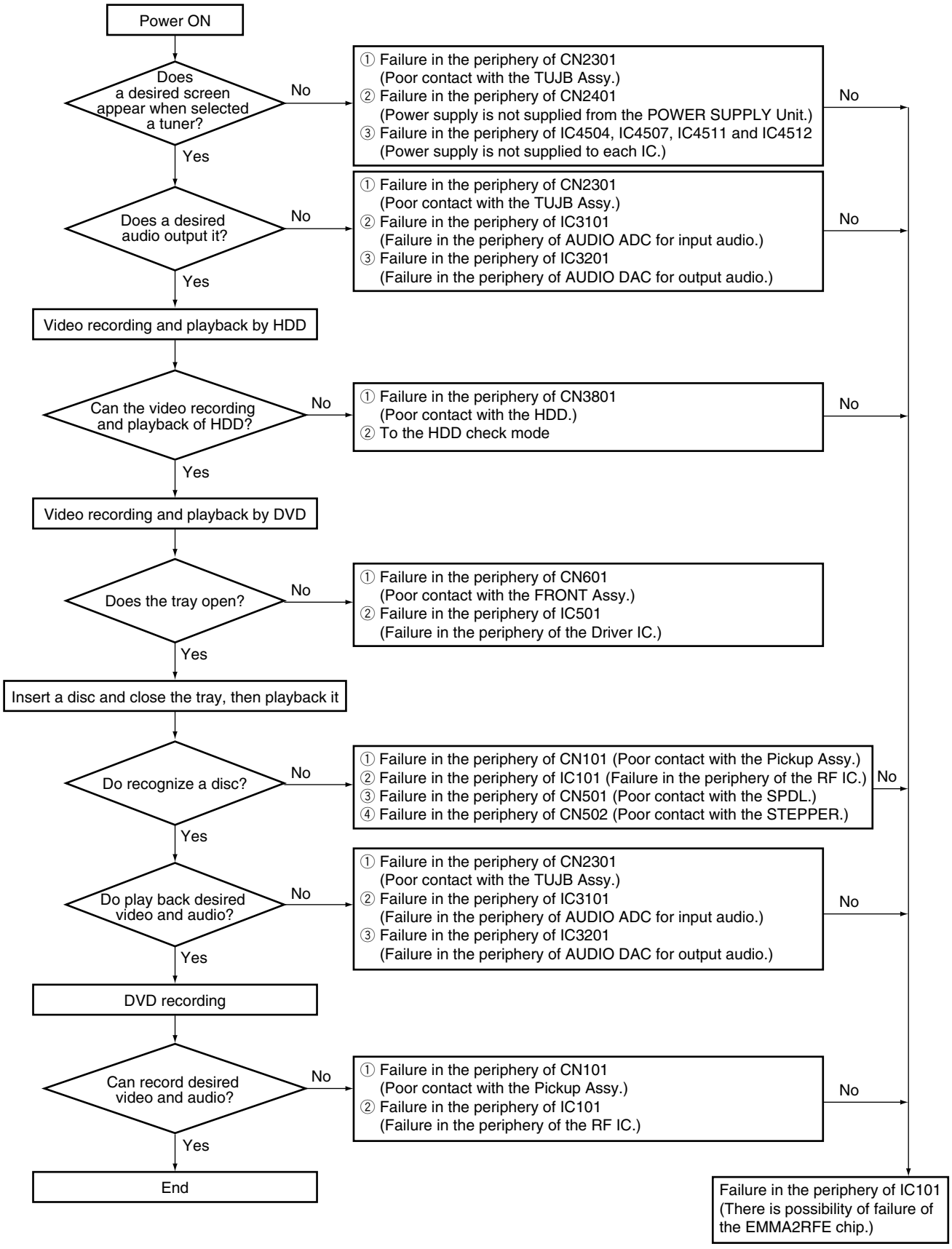


Detailed description on each item on the screen
- Write Error: Number of write errors
- Read Error: Number of read errors
- Compare Error: Number of comparison errors
- Current LBA: The address during testing
- Max LBA: Highest address number of the HDD
- Progress: Percentage of test progress (%)
- Remain Time: Estimated time required for finishing the test across all sectors.
  Estimated time: 3.2 hours/80 GB

Diagnosis results
- If no error occurs in any of the Write/Read/Compare items, the HDD is in normal condition and is not required to be replaced. A block other than the HDD is in failure.
- If any error occurs, the HDD must be replaced.

To terminate the diagnostic program, press the "ESC" key.

7.1.9 DIAGNOSIS OF THE MAIN ASSY



7.1.10 NOTE ON REPLACEMENT OF THE SDRAM

Note when replacing the SDRAM

When replacement of the SDRAM (IC1201 or IC1221) on the MAIN Assy is required, identify the manufacturer of the SDRAM.
If the SDRAM that needs replacement was manufactured by HYNIX, both IC1201 and IC1221 must be replaced at the same time.
SDRAMs for service are manufactured by SAMSUNG.

• How to identify the manufacturer

Confirm the name of the manufacturer stamped on the surface of the part.

By HYNIX (replacement of both SDRAMs required)

By SAMSUNG (replacement of only the defective SDRAM possible)

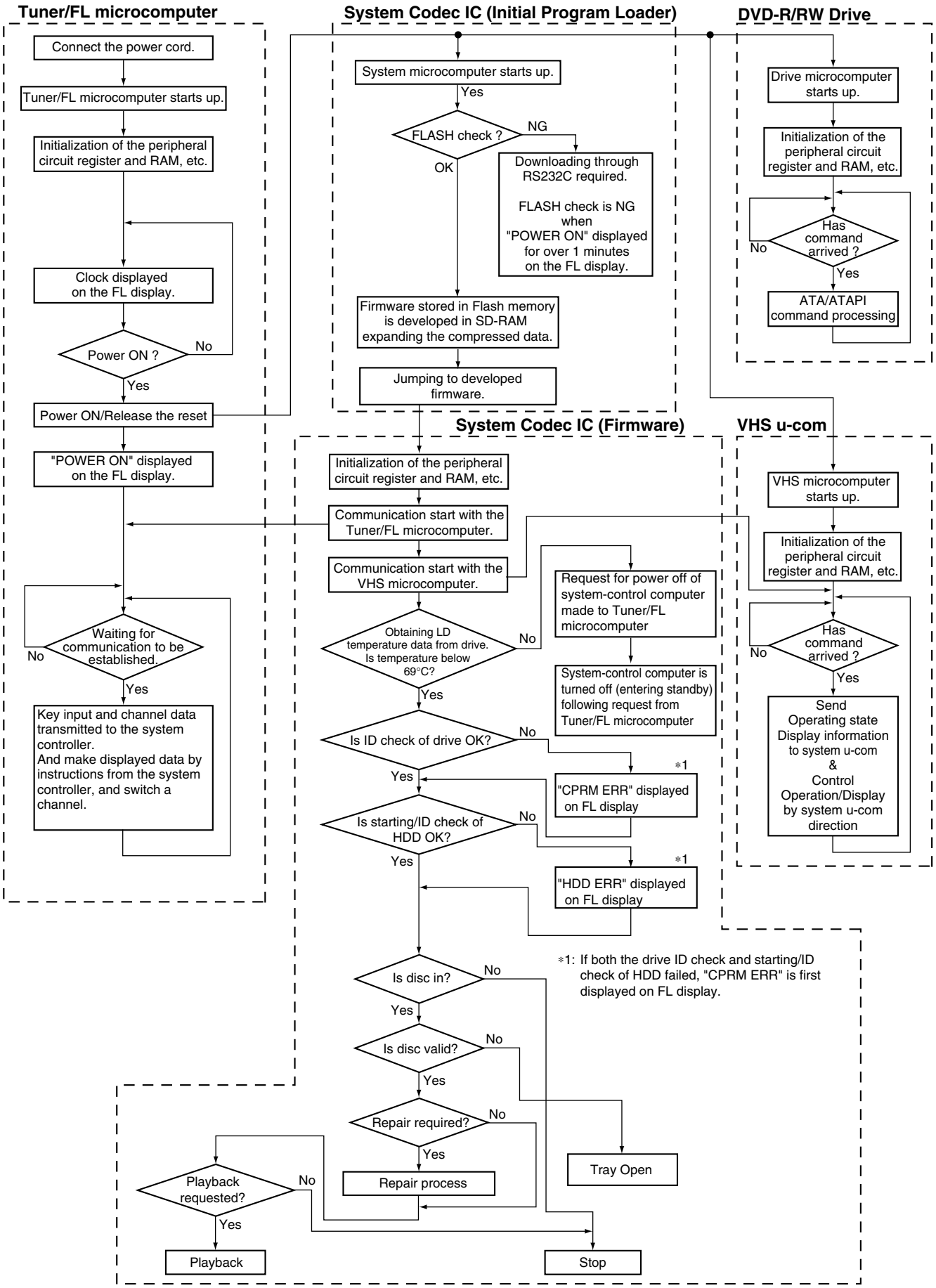
• Measures to be taken

① If the SDRAM that needs replacement was manufactured by HYNIX:
Replace both IC1201 and IC1221 at the same time.
② If the SDRAM that needs replacement was manufactured by SAMSUNG:
Replacement of only the defective SDRAM (IC1201 or IC1221) is possible.

• Possible malfunctions

If SDRAMs made by different manufacturers are mounted on the MAIN Assy, the following malfunctions may occur:
① The power does not come on.
② High-speed dubbing disabled
③ Other malfunctions related to the SDRAM

7.1.11 SETUP SEQUENCE



7.1.12 DISASSEMBLY

1. REMOVAL OF MECHANICAL PARTS AND P.C. BOARDS

1-1: TOP CABINET AND FRONT CABINET (Refer to Fig. 1-1)

1. Remove the 5 screws ①.
2. Remove the Top Cabinet in the direction of arrow (A).
3. Disconnect the following connector: (CP8002, CP8003).
4. Unlock the 8 supports ②.
5. Remove the Front Cabinet in the direction of arrow (B).
6. Remove the 17 screws ③ .
7. Remove the Operation 1 PCB, Operation 2 PCB and Display PCB in the direction of arrow (C).

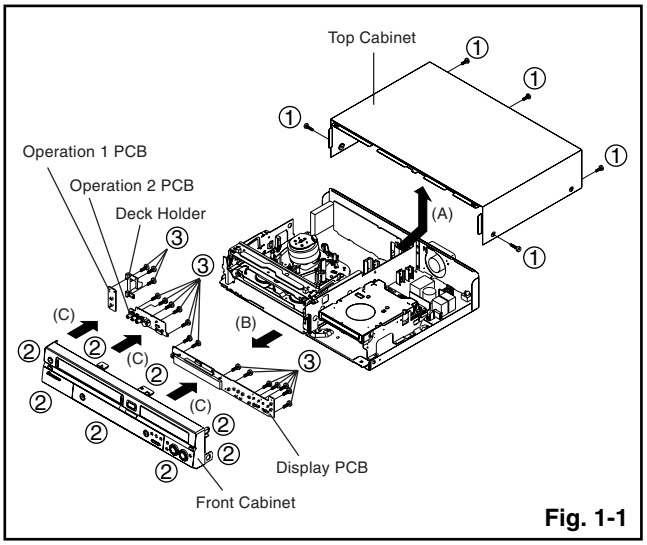


Fig. 1-1

1-2: FLAP (Refer to Fig. 1-2)

1. Open Flap to 90° and flex in direction of arrow (A), at the same time slide in direction of arrow (B).
2. Then lift in direction of arrow (C).

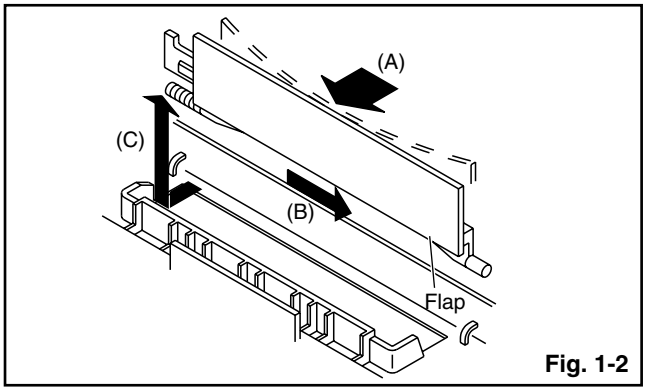


Fig. 1-2

1-3: DECK CD (Refer to Fig. 1-3)

1. Remove the 6 screws ①.
2. Disconnect the following connectors: (CP1501, CP1503, CP1701, CP8104).
3. Remove the LOADER Assy in the direction of arrow (A).
4. Remove the 2 screws ② .
5. Remove the 2 screws ③
6. Remove the 2 screws ④ .
7. Remove the DVD Angle (L) in the direction of arrow (B).
8. Remove the 2 screws ⑤ .
9. Remove the DVD Angle (R) in the direction of arrow (C).

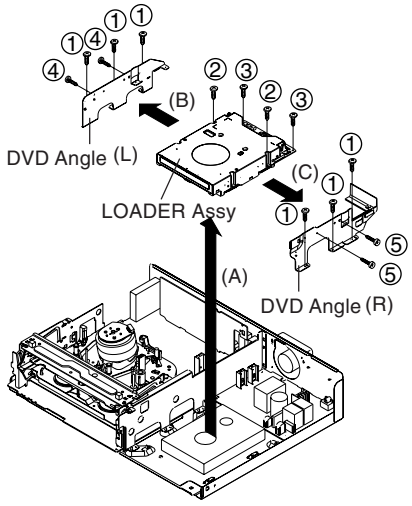


Fig. 1-3

1-4: DVD/HD MPEG PCB (Refer to Fig. 1-4)

1. Disconnect the following connectors: (CP1502, CP1504, CP1700).
2. Remove the 4 screws ① .
3. Remove the HDD Block in the direction of arrow (A).
4. Remove the 2 screws ②.
5. Remove the HDD Angle (L) in the direction of arrow (B).
6. Remove the 2 screws ③.
7. Remove the 2 screws ④.
8. Remove the HDD Angle (R) and RELAY 2 PCB in the direction of arrow (C).
9. Remove the RELAY 1 PCB in the direction of arrow (C).

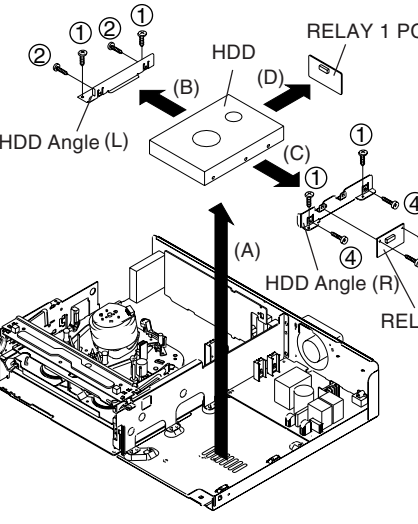


Fig. 1-4

1-5: POWER PCB (Refer to Fig. 1-5)

1. Disconnect the following connector: (CP1702).
2. Remove the 4 screws ①.
3. Remove the Fan Holder and Fan Motor in the direction of arrow (A).
4. Remove the screw ②.
5. Remove the 4 screws ③.
6. Disconnect the following connectors: (CP1701, CP1703).
7. Remove the POWER PCB in the direction of arrow (B).

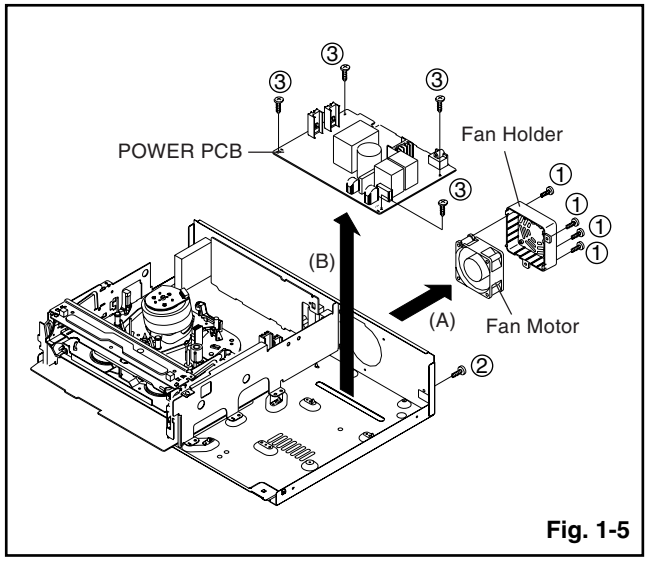


Fig. 1-5

1-6: VCR DECK (Refer to Fig. 1-6)

1. Unlock the 2 supports ① and removes the Top Holder.
2. Move the Cassette Holder Assy to the back side.
3. Remove the 3 screws ② .
4. Disconnect the following connectors: (CP101, CP102, CP103, CP3001)
5. Remove the AC Head Cover and VCR Deck in the direction of arrow.

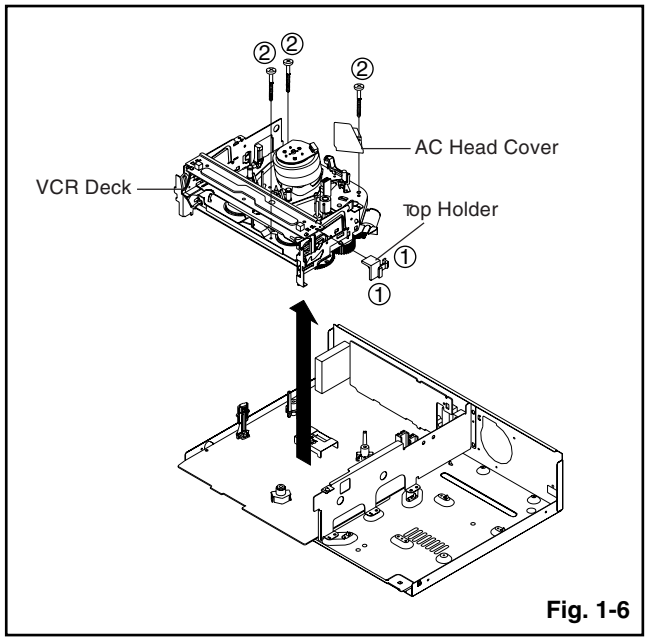


Fig. 1-6

1-7: VCR MT PCB AND AV PCB (Refer to Fig. 1-7)

1. Remove the screw ①.
2. Remove the screw ②.
3. Remove the 6 screws ③.
4. Remove the VCR MT PCB and AV PCB in the direction of arrow.

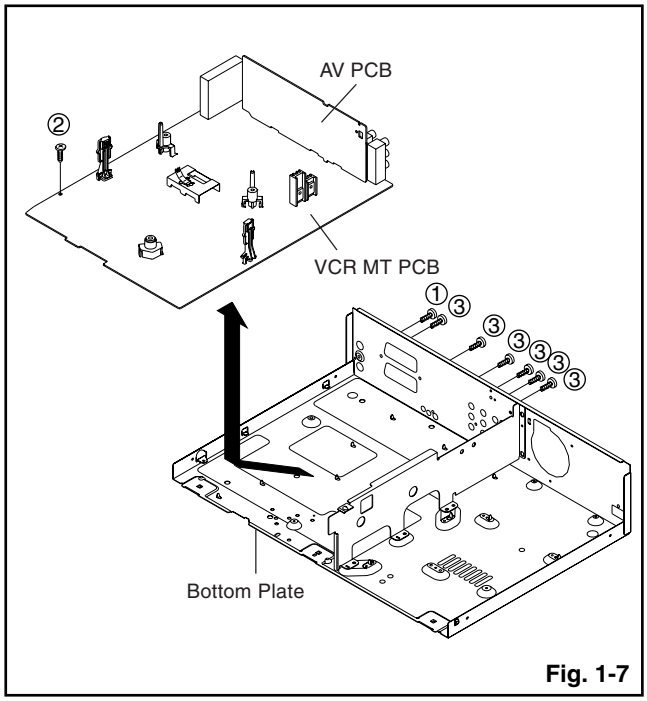


Fig. 1-7

2. REMOVAL OF VCR DECK PARTS

2-1: TOP BRACKET (Refer to Fig. 2-1)

1. Extend the 2 supports ①.
2. Slide the 2 supports ② and remove the Top Bracket.

NOTE

1. After the installation of the Top Bracket, bend the support ① so that the Top Bracket is fixed.

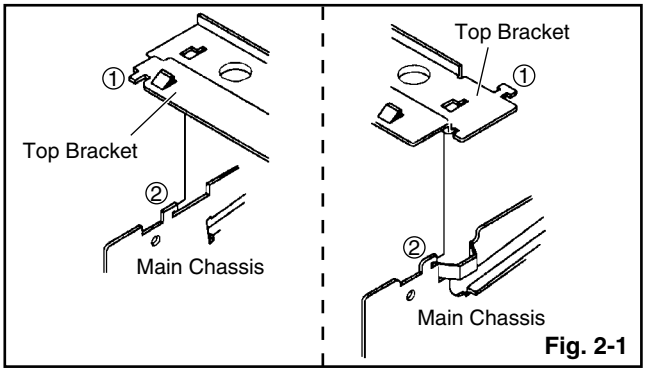


Fig. 2-1

2-2: CASSETTE HOLDER ASSY (Refer to Fig. 2-2)

1. Move the Cassette Holder Assy to the front side.
2. Push the Locker R to remove the Cassette Side R.
3. Remove the Cassette Side L.

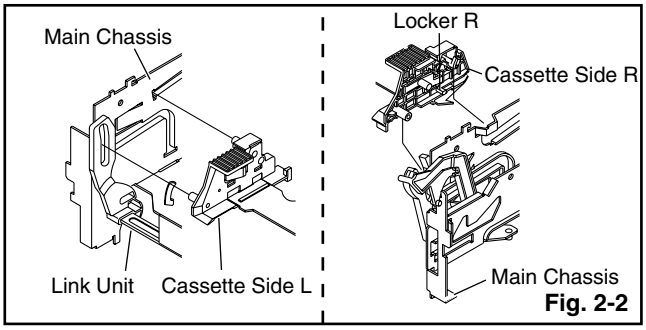


Fig. 2-2

2-3: LINK UNIT (Refer to Fig. 2-3)

1. Set the Link Unit to the Eject position.
2. Unlock the support ①.
3. Remove the (A) side of the Link Unit first, then remove the (B) side.

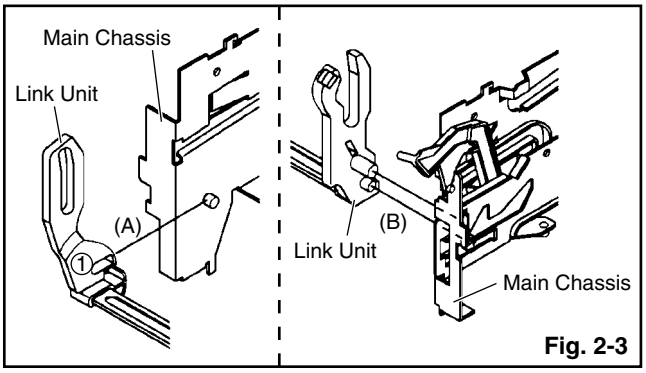


Fig. 2-3

2-4: LINK LEVER/FLAP LEVER (Refer to Fig. 2-4)

1. Extend the support ①.
2. Remove the Link Lever.
3. Remove the Flap Lever.

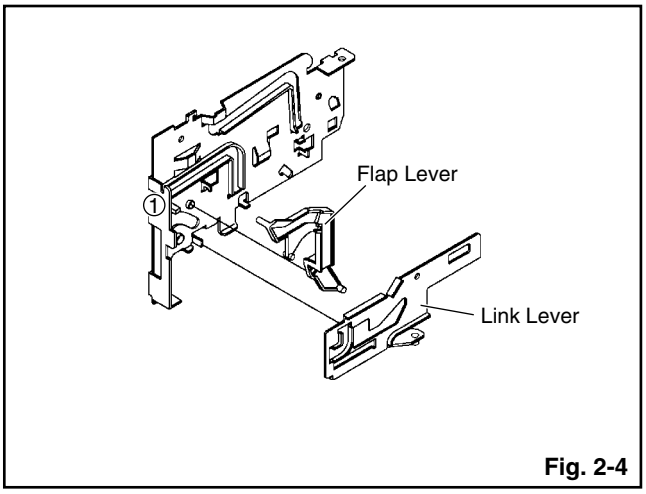


Fig. 2-4

2-5: LOADING MOTOR/WORM (Refer to Fig. 2-5-A)

1. Remove the screw ①.
2. Remove the Loading Motor.
3. Remove the Worm.

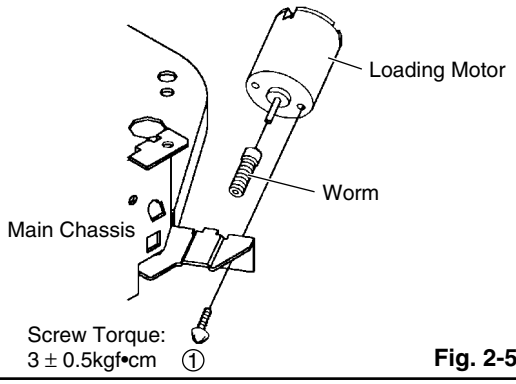


Fig. 2-5-A

NOTE:

1. In case of the Worm installation, check if the value of the Fig. 2-5-B is correct.
2. In case of the Loading Motor installation, hook the wire on the Cassette Opener as shown Fig. 2-6-C.
3. When installing the wires between Capstan DD Unit and Loading Motor, connect them correctly as shown Fig. 2-5-D.

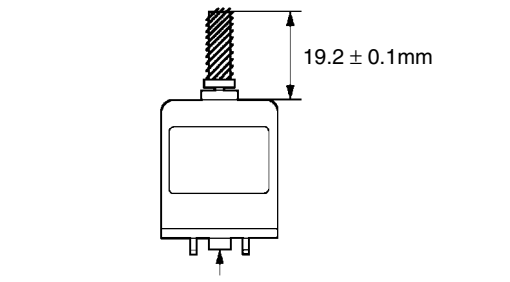


Fig. 2-5-B

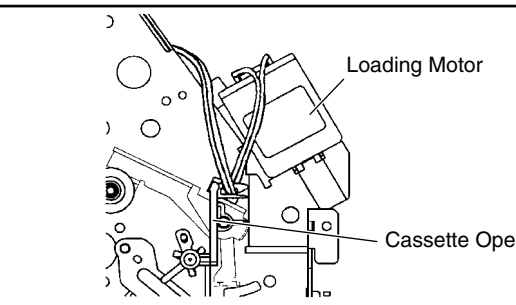


Fig. 2-5-C

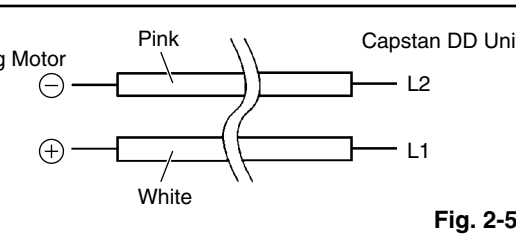


Fig. 2-5-D

2-6: TENSION ASSY (Refer to Fig. 2-6-B)

1. Turn the Pinch Roller Cam clockwise so that the Tension Holder hook is set to the position of Fig. 2-6-A to move the Tension Arm Assy.
2. Remove the Tension Spring.
3. Unlock the 2 supports ① and remove the Tension Band.
4. Unlock the support ② and remove the Tension Arm Assy.
5. Unlock the support ③ and remove the Tension Connect.
6. Float the hook ④ and turn it clockwise then remove the Tension Holder.

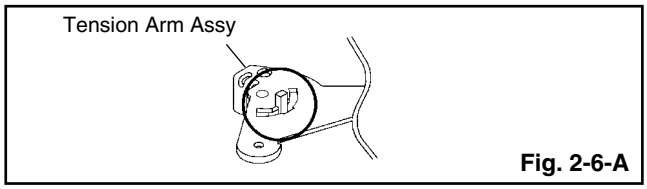


Fig. 2-6-A

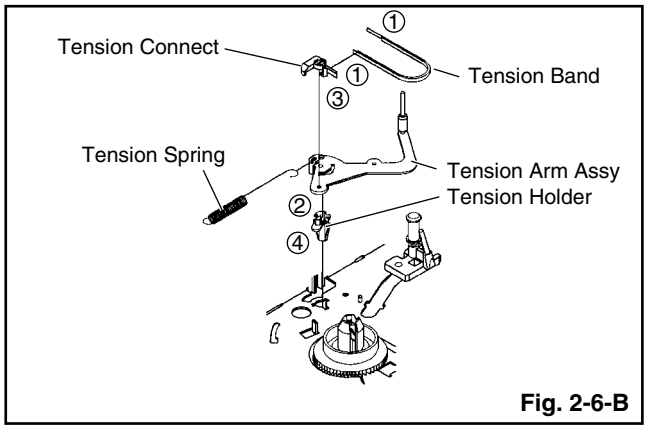


Fig. 2-6-B

NOTE:

1. In case of the Tension Band installation, note the direction of the installation. **(Refer to Fig. 2-6-C)**
2. In case of the Tension Band installation, install correctly as Fig. 2-6-D.
3. In case of the Tension Connect installation, install as the circled section of Fig. 2-6-E.

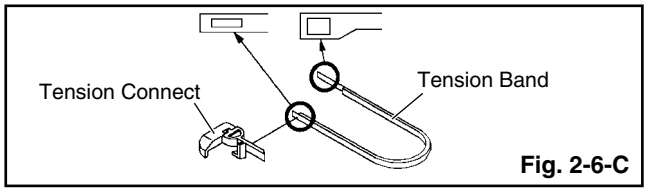


Fig. 2-6-C

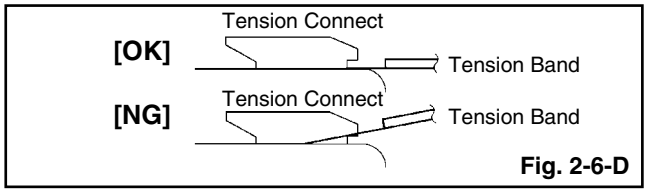


Fig. 2-6-D

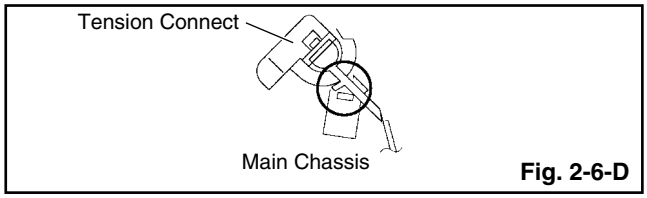


Fig. 2-6-D

2-7: T BRAKE ARM/T BRAKE BAND (Refer to Fig. 2-7-A)

1. Remove the T Brake Spring.
2. Turn the T Brake Arm clockwise and bend the hook section to remove it.
3. Unlock the 2 supports ① and remove the T Brake Band.

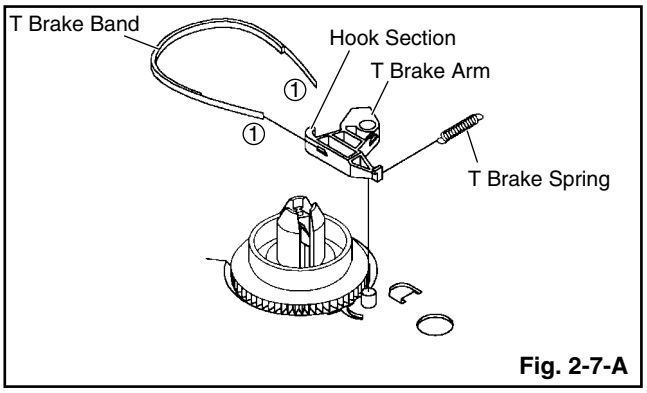


Fig. 2-7-A

NOTE:

1. In case of the T Brake Band installation, install correctly as Fig. 2-7-B.

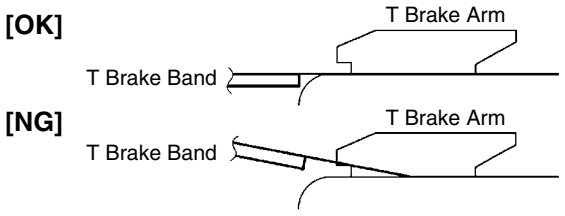


Fig. 2-7-B

2-8: S REEL/T REEL/IDLER ARM ASS'Y/IDLER GEAR (Refer to Fig. 2-8-A)

1. Remove the S Reel and T Reel.
2. Remove the 2 Polyslider Washers ①.
3. Remove the Idler Arm Ass'y and Idler Gear.

NOTE:

1. Take care not to damage the gears of the S Reel and T Reel.
2. The Polyslider Washer may be remained on the back of the reel.
3. Take care not to damage the shaft.
4. Do not touch the section "A" of S Reel and T Reel. (Use gloves.) **(Refer to Fig. 2-8-A)** Do not adhere the stains on it.
5. When you install the reel, clean the shaft and grease it (FG-84M). (If you do not grease, noise may be heard in FF/REW mode.)
6. After installing the reel, adjust the height of the reel. **(Refer to MECHANICAL ADJUSTMENT)**

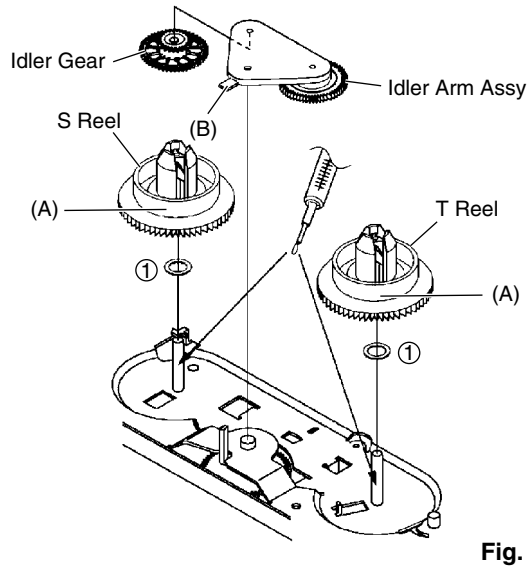


Fig. 2-8-A

NOTE:

1. In case of the S Reel and T Reel installation, check if the correct parts are installed. **(Refer to Fig. 2-8-B)**
2. In case of the Idler Arm Ass'y installation, install correctly as Fig. 2-8-C. And also set it so that the section "B" of Fig. 2-8-A is placed under the Main Chassis tab.

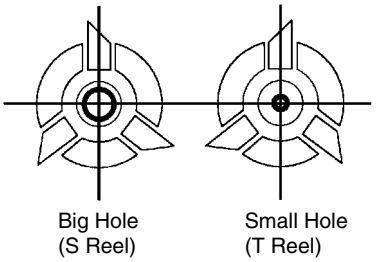


Fig. 2-8-B

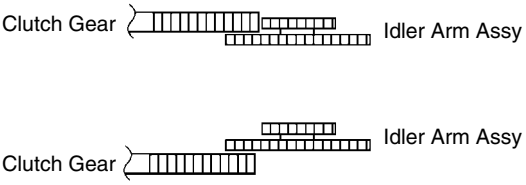


Fig. 2-8-C

2-9: CASSETTE OPENER/PINCH ROLLER BLOCK/P5 ARM ASSY (Refer to Fig. 2-9-A)

1. Unlock the support ① and remove the Cassette Opener.
2. Remove the Pinch Roller Block and P5 Arm Assy.

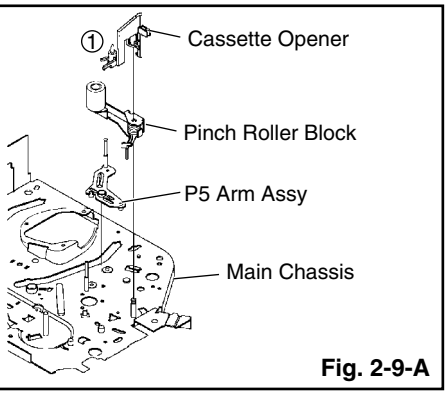


Fig. 2-9-A

NOTE:

1. Do not touch the Pinch Roller. (Use gloves.)
2. In case of the Pinch Roller Block and the Pinch Roller Cam installation, install correctly as Fig. 2-9-B.

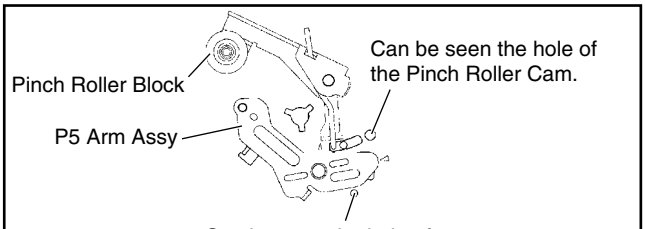


Fig. 2-9-B

2-11: A/C HEAD (Refer to Fig. 2-10-A)

1. Remove the screw ①.
2. Remove the A/C Head Base.
3. Remove the 3 screws ②.
4. Remove the A/C Head and A/C Head Spring.

NOTE:

1. Do not touch the A/C Head. (Use gloves.)
2. When you install the A/C Head Spring, install as shown in Fig. 2-11-B.
3. When you install the A/C Head, tighten the screw (1) first, then tighten the screw (2), finally tighten the screw (3).

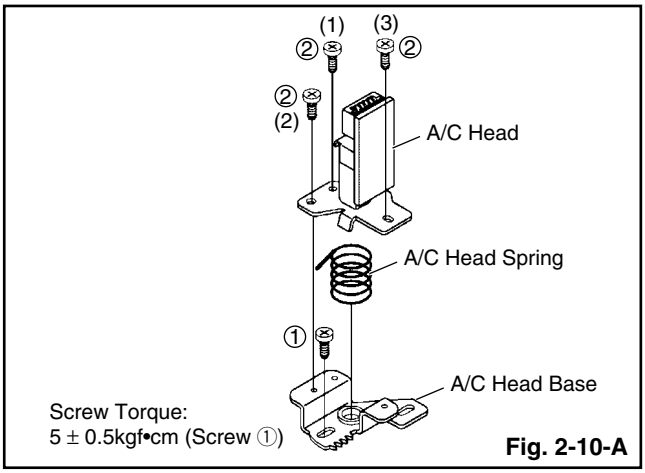


Fig. 2-10-A

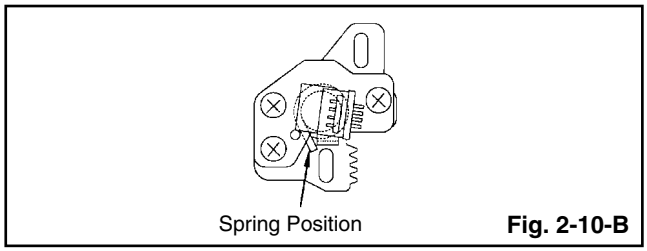


Fig. 2-10-B

2-11: FE HEAD (RECORDER ONLY) (Refer to Fig. 2-11)

1. Remove the screw ①.
2. Remove the FE Head.

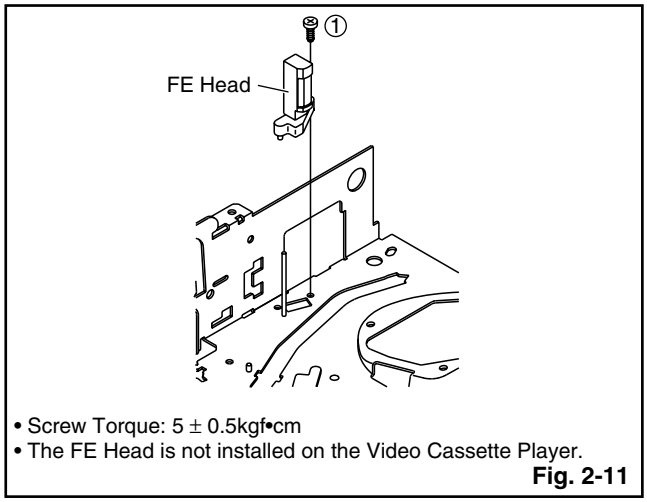


Fig. 2-11

2-12: CYLINDER UNIT ASSY (Refer to Fig. 2-12)

1. Disconnect the following connector: (CD2001)
2. Remove the 3 screws ②.
3. Remove the Cylinder Unit Assy.

NOTE:

1. When you install the Cylinder Unit Assy, tighten the screws from (1) to (3) in order while pulling the Assy toward the left front direction.

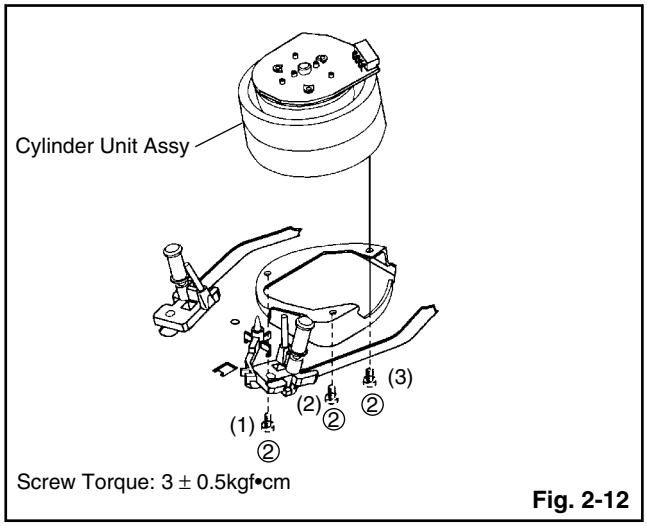
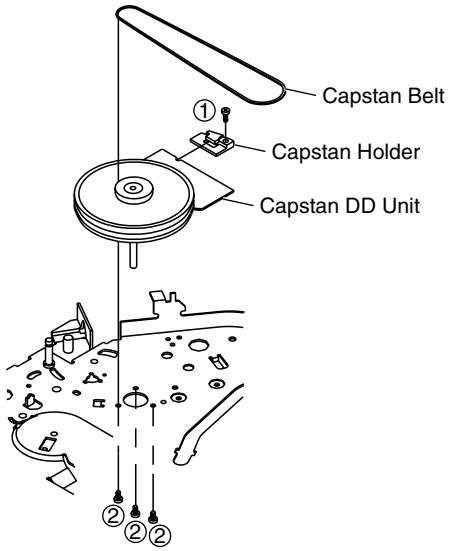


Fig. 2-12

2-13: CAPSTAN DD UNIT (Refer to Fig. 2-14)

1. Remove the Capstan Belt.
2. Remove the screw ①.
3. Remove the Capstan Holder.
4. Remove the 3 screws ②.
5. Remove the Capstan DD Unit.



Screw Torque: 4 ± 0.5kgf•cm

Fig. 2-13

2-14: MAIN CAM/PINCH ROLLER CAM/JOINT GEAR (Refer to Fig. 2-14-A)

1. Remove the E-Ring ①, then remove the Main Cam.
2. Remove the E-Ring ②, then remove the Pinch Roller Cam and Joint Gear.

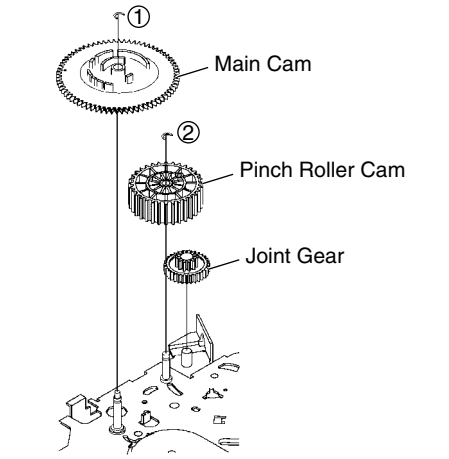


Fig. 2-14-A

NOTE:

1. In case of the Pinch Roller Cam and Main Cam installation, install them as the circled section of Fig. 2-15-B so that the each markers are met. **(Refer to Fig. 2-14B)**

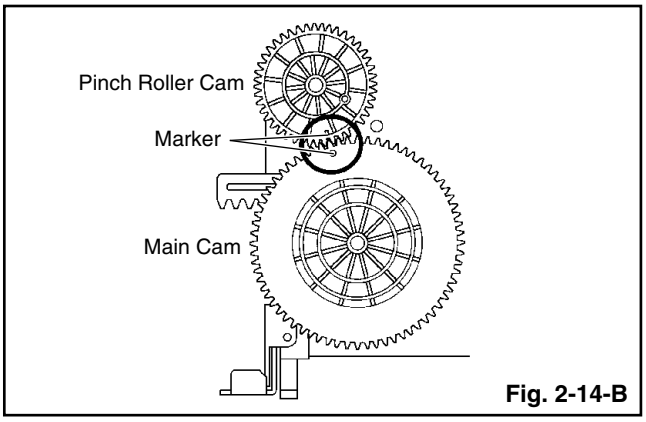


Fig. 2-14-B

2-15: LOADING GEAR S/T UNIT (Refer to Fig. 2-15-A)

1. Remove the E-Ring ① and remove the Main Loading Gear.
2. Remove the Main Rod, Tension Lever, Loading Arm S Unit and Loading Arm T Unit.

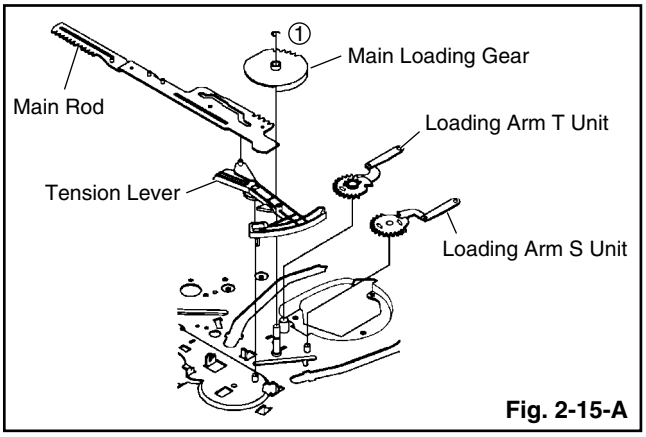


Fig. 2-15-A

NOTE:

1. When you install the Loading Arm S Unit, Loading Arm T Unit and Main Loading Gear, align each marker. **(Refer to Fig. 2-15B)**

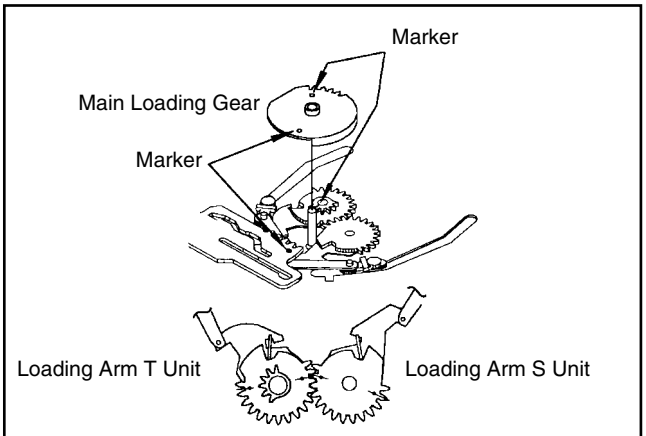


Fig. 2-15-B

2-16: CLUTCH ASSY/RING SPRING/CLUTCH LEVER/CLUTCH GEAR (Refer to Fig. 2-16-A)

1. Remove the Polyslider Washer ①.
2. Remove the Clutch Assy and Ring Spring.
3. Remove the Clutch Lever.
4. Remove the Coupling Gear, Coupling Spring and Clutch Gear.

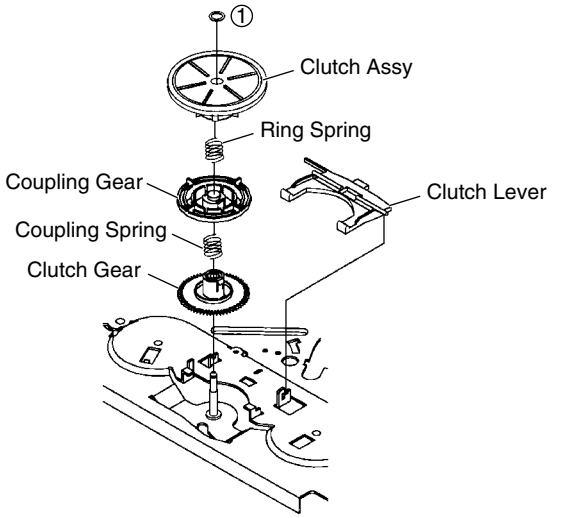


Fig. 2-16-A

NOTE:

1. In case of the Clutch Assy installation, install it with inserting the spring of the Clutch Assy into the dent of the Coupling Gear. **(Refer to Fig. 2-16-B)**

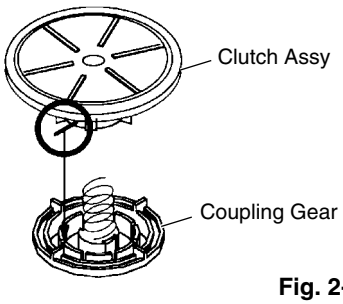
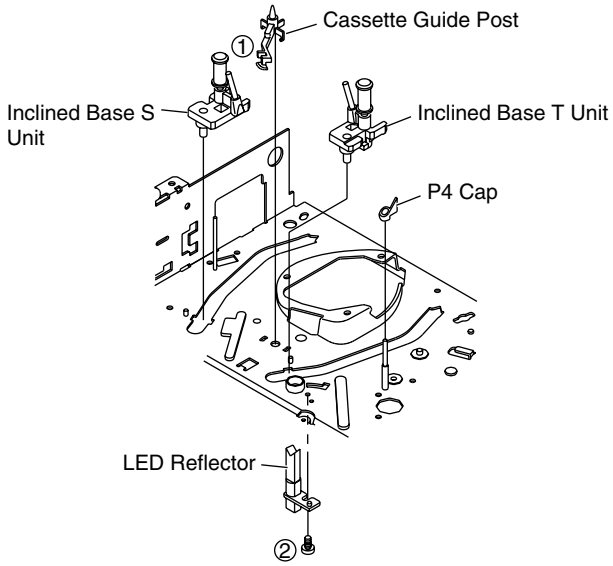


Fig. 2-16-B

2-17: CASSETTE GUIDE POST/INCLINED BASE S/T UNIT/P4 CAP/LED REFLECTOR (Refer to Fig. 2-17-A)

1. Remove the P4 Cap.
2. Unlock the support ① and remove the Cassette Guide Post.
3. Remove the Inclined Base S/T Unit.
4. Remove the screw ②.
5. Remove the LED Reflector.



Screw Torque: 5 ± 0.5kgf•cm

Fig. 2-17-A

NOTE:

1. Do not touch the roller of Guide Roller.
2. In case of the P4 Cap installation, install it with parallel for "A" and "B" of Fig. 2-17-B.
3. In case of the Cassette Guide Post installation, install correctly as the circled section of Fig. 2-17-C.

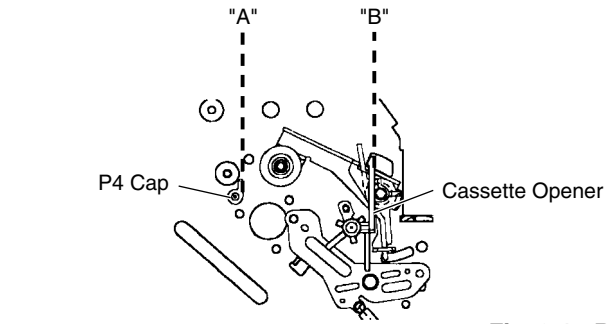


Fig. 2-17-B

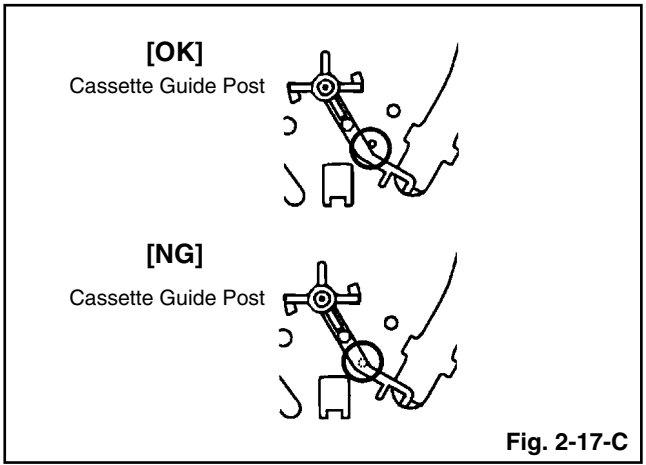


Fig. 2-17-C

7.2 DISC REMOVAL METHOD

1. Remove the Top Cabinet. **(Refer to item 1 of the DISASSEMBLY INSTRUCTIONS.)**
2. Insert a fine rod (wire etc.) into the hole of the LOADER Assy as shown by the arrow. **(Refer to Fig. 1)**
   The tray is opened.
3. Manually open the tray.

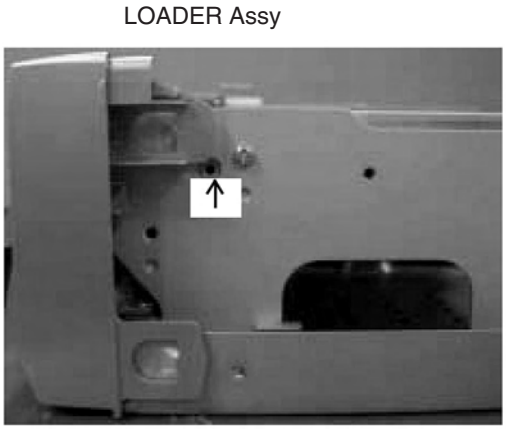


Fig. 1

7.3 TAPE REMOVAL METHOD AT NO POWER SUPPLY

1. Remove the Top Cabinet, Front Cabinet and DVD Block. **(Refer to item 1 of the DISASSEMBLY INSTRUCTIONS.)**
2. Remove one screw of the Loading Motor from the insert hole for screw driver and remove the Loading Motor.
3. Rotate the Pinch Roller Cam in the direction of the arrow by hand to slacken the Video Tape.
   (Refer to Fig. 2)
4. Rotate the Clutch Ass'y either of the derections to wind the Video Tape in the Cassette Case.
5. Repeat the above step 3~4. Then take out the Video Cassette from the Deck Chassis. Be careful not to scratch on the tape.

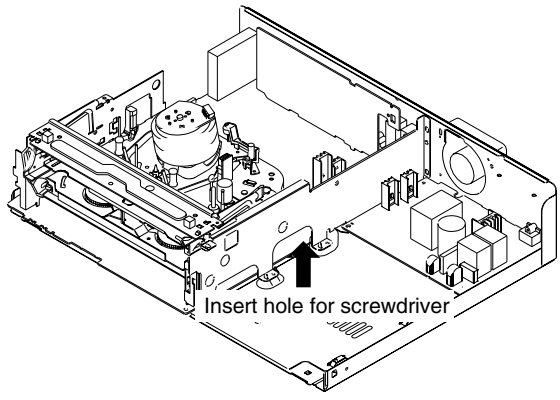


Fig. 1

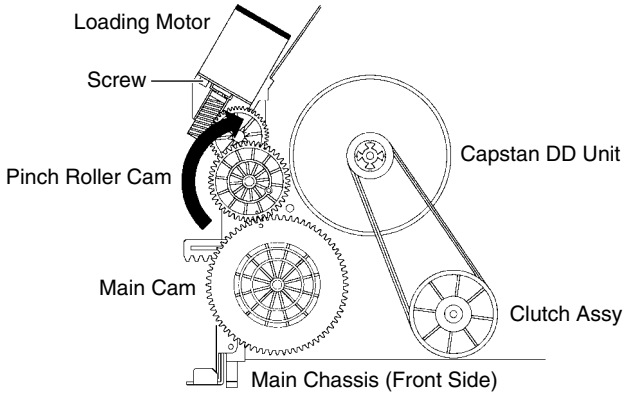


Fig. 2

7.4 IC

• The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

● **List of IC**

I53F0C010A, I54F50163A, UPD61272F1-107KA3A, PCA9557PW, 107F072360

■ I53F0C010A (PMC010A8) (SERVICE VCR ASSY : IC3302)

• TUNER Microcomputer

● **Pin Function**

No.	Pin Name	Signal Name	I/O	Function	Active
1	PA3/S08	FLDATA	O	Communication line with FL Driver From tuner con to FL driver	
2	PA4/SI8/SB8	FLSTB	O	Communication strobe line with FL Driver	
3	PA5/SCK8	FLCLK	O	Communication clock with FL Driver	
4	P70/INTO/TOCLP	WDT	I	WDT for u-com runnaway detectionl	
5	P71/INT1/TOHCP	ACDET	I	Existence detection of AC power	
6	P72/INT2/TOIN/TOLCP	HS_MTMOT	I	System control u-com communication handshake	
7	P73/INT3/TOIN/TOHCP	IR	I	Pulse input of remote control	
8	RES#	XRESET	I	Reset input	
9	XT1	XT1	I	Sub clock connection 32.768 kHz	
10	XT2	XT2	O	Sub clock connection	
11	VSS1	GND	–		
12	CF1	CF1	I	Main clock connection 15 MHz	
13	CF2	CF2	O	Main clock connection	
14	VDD1	VDD1	–		
15	P80/AN0	MODEL1	Analog In	Input #1 for model type judgement	
16	P81/AN1	MODEL2	Analog In	Input #1 for model type judgement	
17	P82/AN2	KEY1	Analog In	Main unit key input #1	
18	P83/AN3	KEY2	Analog In	Main unit key input #2	
19	P84/AN4	KEY3	Analog In	Main unit key input #3	
20	P85/AN5	AGC	Analog In	AGC voltage input from the tuner	
21	P86/AN6	BATTERY	Analog In	Input for battery voltage check	
22	P87/AN7	FUNC	Analog In	Signal input for SCART Function	
23	P10/SO0	SDET3	I	Plug detection of S tereminal #3	
24	P11/SI0/SB0	SDET2	I	Plug detection of S tereminal #2	
25	P12/SCK0	SDET1	I	Plug detection of S tereminal #1	
26	P13/SO1	AVLOUT	O	NextTViewLink output signal	
27	P14/SI1/SB1	SDA	Nch O/D	I2C communication (data)	
28	P15/SCK1	SCL	Nch O/D	I2C communication (clock)	
29	P16/T1PWML	XSYSRST	O	IC reset signal of whole system	
30	P17/T1PWMH/BUZ	TUDET	I	The old and the new distinction of the tuner pack L : new , H : old	
31	PE0/AN12	MUTEV	O	CVBS, Y/C mute signal for video driver IC	
32	PE1/AN13	LED_DUB	O	LED for dubbing H : LED On at dubbing	
33	PE2/AN14	AMUTE2	O	Audio mute signal of ouput stage H : Release, L : Mute	
34	PE3/AN15	SELV1	O	Input selection of video selector INSEL 1 of LA73031	
35	PE4	SELV2	O	Input selection of video selector INSEL 2 of LA73031	
36	PE5	SELV3	O	Input selection of video selector INSEL 3 of LA73031	
37	PE6	YCSEL	O	CVBS or Y/C selection of video selector	
38	PE7	STBYVS	O	Standby mode switch of video selector	
39	VSS4	GND	–		
40	VDD4	VDD4	–		

No.	Pin Name	Signal Name	I/O	Function	Active
41	PF0	LET	O	Letter-box output superimposed signal Function output signal	
42	PF1	SQU	O	Squeese output superimposed signal	
43	PF2	CONDET	O	Electric discharge detection of capcitor for power supply backup	
44	PF3	S1	O	S1/S2 switching signal	
45	PF4	IROUT	O	Pulse output for IR blaster	
46	PF5	P_SAVE2	O	Power save mode switch of HA118326	
47	PF6	PSMUTE	O	Audio mute control of SCART	
48	PF7	XAVLTH	O	Through selection of AV.Link communication line	
49	SI2P0/SO2	EXT_SEL	O	Output selection switch for Video and Audio	
50	SI2P1/SI2/SB2	LED_VHS	O	VHS LED	
51	SI2P2/SCK2	XRESET2	O	Reset output	
52	SI2P3/SCK2O	RFTHRU	O	RF through switch of the tuner	
53	PWM1	NC	O		
54	PWM0	FANCTRL	O	Radiation of heat fan rotating speed control	
55	VDD2	VDD2	–		
56	VSS2	GND	–		
57	PO0	P_CONT2	O	Power supply control of the main board For controlling 2.5V to 3.3V	
58	PO1	MUTECTL	O	Mute invalidity control Port to suppress last mute	
59	PO2	EPGEXT	O	Equaliser selection of slicer input video	
60	PO3	TUON	O	Power supply control of the tuner section	
61	PO4	NC	O		
62	PO5/CKO	P_CONT	O	Power supply control of the whole system	
63	PO6/T6O	FLON	O	Power supply control of the FL tube	
64	PO7/T7O	XP_SAVE	O	Power supply control of European video system	
65	P20/INT4/T1IN/TOCLP/TOHCP/INT6	STATCHG	I	Detection of audio multi-plex status change of MSP	
66	P21/INT4/T1IN/TOCLP/TOHCP	NC	I		
67	P22/INT4/T1IN/TOCLP/TOHCP/HCTR	CSYNCIN	I	C-sync for Auto-Rec	
68	P23/INT4/T1IN/TOCLP/TOHCP	XCHECKER	I	Unit checker mounting distinction	
69	P24/INT5/T1IN/TOCLP/TOHCP/INT7	MRST	I	Main Board power failure detection	
70	P25/INT5/T1IN/TOCLP/TOHCP	AVLIN	I	Input line of NexTViewLink	
71	P26/INT5/T1IN/TOCLP/TOHCP	X525P	I	525P output signal from the system controller	
72	P27/INT5/T1IN/TOCLP/TOHCP	BLANKIN	I	BLANK signal input of the SCART	
73	P30/PWM4	SCV_SEL	O	"L" when AV2(RGB) and BLANKING(L) RGB is selected.	
74	P31/PWM5	TU_DCCON	O	DC/OC converter for +32V generation	
75	P32/UTX1	TXD1	O	Transmission for RS232-C terminal	
76	P33/URX1	RXD1	I	Reception for RS232-C terminal	
77	P34/UTX2	TXD2	O	UART2 transmission Not used	
78	P35/URX2	RXD2	I	UART2 transmission Not used	
79	P36	HS_TTOM	O	System controller communication handshake SYS → Tuner	
80	VDDODA	VDDODA	–		

No.	Pin Name	Signal Name	I/O	Function	Active
81	PB6/CVD/CSYNC	CVBSIN	I	Input video for data slicer	
82	VSSVCO	GND	–		
83	PB4/FILTSLC	FILTSLC	I	External filter for slicer PLL	
84	VDDVCO	VDDVCO	–		
85	PB2	NC	O		
86	PB1	WAKE_UP	O	Power-ON request for VCR	
87	PB0/DS1FLD	P_SAVE	O	Power save mode	
88	VSS3	GND	–		
89	VDD3	VDD3	–		
90	PC7/DBGP2	DBGP2	Nch O/D	Control port for on-chip debugger	
91	PC6/DBGP1	DBGP1	Nch O/D	Control port for on-chip debugger	
92	PC5/DBGP0	DBGP0	Nch O/D	Control port for on-chip debugger	
93	PC4/AN10	C/N	O	VCR indicator	
94	PC3/AN11	BS15IN	O	Not used for Europe model	
95	PC2/AN9	BS15SRT	O	Not used for Europe model	
96	PC1/AN8	BS15ON	O	Not used for Europe model	
97	PC0/OCSYNC	P_SAVEBS	O	Not used for Europe model	
98	PA0/SO7	SD_TTOM	O	Communication data line of sys con Tuner → Sys	
99	PA1/SI7/SB7	SD_MTOT	I	Communication data line of sys con Sys → Tuner	
100	PA2/SCK7	SCK_MTOT	I	Communication clock of sys con Sys → Tuner	

■ I54F50163A (OEC0163A) (SERVICE VCR ASSY : IC3002)

• VCR microcomputer

No.	PORT	SIGNAL NAME	I/O	DESCRIPRION
1	SVss	SVSS	-	GND for Servo.
2	CTLREF	CTLREF	-	CTL Amplifier Reference output. (1/2VCC output)
3	CTL(+)	CTL(+)	-	CTL Head (+).
4	CTL(-)	CTL(-)	-	CTL Head (-).
5	CTLBias	CTLBIAS	-	Bias supply terminal of CTL Primary Amplifier.
6	CTLFB	CTLFB	I	CTL Feedback input.
7	CTLAmp(o)	CTLAMP(O)	O	CTL Amplifier output.
8	CTLSMT(i)	CTLAMP(I)	I	CTL Schmidt Amplifier input.
9	CFG	CFG	I	Capstan FG input.
10	SVcc	SVcc	-	Power supply for Servo.
11	AFCpc	AFCPC	-	AFC Oscillation terminal.
12	AFCosc	AFCOSC	-	AFC Oscillation terminal.
13	AFCLPF	AFCLPF	-	External LPF terminal for AFC.
14	Csync/Hsync	CSYNC	O	SYNC output.
15	VLPF/Vsync	VSYNC	I	SYNC input. (from 14pin)
16	CVin2	CVIN2	I	Video Signal input for Data Slicer.
17	CVin1	CVIN1	I	Video Signal input for OSD. (On Screen Display)
18	OVcc	OVCC	-	Power supply for OSD.
19	CVout	CVOUT	O	Video Signal output. (with OSD)
20	OVss	OVSS	-	GND for OSD.
21	4fscout/2fscout	4FSCOUT	O	4FSC output.
22	4fscin/2fscin	4FSCIN	I	4FSC output. (from Y/C)
23	AVss	AVSS	-	GND for A/D Conversion.
24	ANB	VIDEO_ENV	I	Detection terminal for Video Tracking Envelope.
25	ANA	BOT	I	BOT detection terminal. (Begin of Tape)
26	AN9	EOT	I	EOT detection terminal. (End of Tape)
27	AN8	MSSEN_B	I	Mechanism State Sensor.
28	P07/AN7	MSSEN_A	I	Mechanism State Sensor.
29	P06/AN6	AN6	I	Reserved. (L output)
30	P05/AN5	AN5	I	Reserved. (L output)
31	P04/AN4	AN4	I	Reserved. (L output)
32	P03/AN3	Hi-Fi_ENV	I	Detection terminal for Hi-Fi Tracking Envelope.
33	P02/AN2	AN2	I	Reserved. (L output)
34	P01/AN1	SERVICE	I	Input terminal for service mode. L: Service mode H: Usually
35	P00/AN0	AN0	I	Reserved. (L output)
36	AVcc	AVCC	-	Power supply for A/D Conversion.
37	P10/_IRQ0	POWER_FAIL	I	Detection terminal for Power Fail. H: Normal, L: Power Fail
38	P11/_IRQ1	NC	O	Reserved. (L output)
39	P12/_IRQ2	NC	O	Reserved. (L output)

No.	PORT	SIGNAL NAME	I/O	DESCRIPRION
40	P13/_IRQ3	NC	O	Reserved. (L output)
41	P14/_IRQ4	POWER_ON-H	O	VCR block POWER control terminal. L: At the POWER OFF, it is H: POWER ONing it. The P. SAVE mode inside is assumed to be L output. Moreover, it uses it combinedly the FZTAT writing mode setting input. (writing mode when"H" is input)
42	P15/_IRQ5	CFG_IN2	I	Input terminal for CFG. It is used for Slow stop detection.
43	P16/_IC	BB SECAM-H	O	Measures of OSD display at SECAM. Output terminal for Y/C control for BLUE_BACK. L: At PAL. H: When not is in BLUE_BACK and BLACK BACK in SECAM and MESECAM
44	P17/_TMOW	S-DET OUT	I	Distinction input terminal of "SQPB and normal VHS. (two-degree agreement of 10ms) H: SQPB L: Normal VHS"
45	P67/RP7/TMBI	MESECAM-H	I	Input of MESECAM distinction voltage from Y/C IC. (two-degree agreement of 10ms) H:at MESECAM L: The rest
46	P66/RP6/_ADTRG	VV-H	O	H: VV picture output. (PLAY, Special reproduction) L: the rest
47	P65/RP5	SECAM-IN	I	Distinction input terminal from SECAM_IC. (four-degree agreement of 10ms) H: Excluding SECAM L: SECAM
48	P64/RP4	SECAM-H	O	Terminal for SECAM_IC control. H: When SECAM is distinguished with MENU by "COLOR_SYSTEM=SECAM" and "COLPR_SYSTEM=AUTO". L: Excluding the above-mentioned (With PAL, MESECAM, and AUTO excluding SECAM)
49	P63/RP3	NC	O	Reserved. (L output)
50	P62/RP2	NC	O	Reserved. (L output)
51	P61/RP1	TAB_SW	I	Detection terminal for TAB.
52	P60/RP0	NC	O	Reserved. (L output)
53	P37/TM0	TUNER_AUDIO_MUTE-H	O	S/N control when Hi-Fi TAPE reproduces. H: When reproducing in the VCR mode, it is L: Others.
54	P36/BUZZ	NC	O	Reserved. (L output)
55	P35/PWM3	P.SAVE	I	Transition to power saving mode H : at time usually L : At the power saving
56	Vcc	VCC	-	Power supply terminal.
57	Vss	VSS	-	GND.
58	P27/SYNCI	AUDIO_MUTE-H	O	Control terminal for Audio Mute. H: Power On/Off, Recoding/Playing, Trick PB, Input Select. L: during Power Off.
59	P26/SCL0	MPEG_IIC_CLK	O	Terminal IIC BUS for MPEGu-con. (CLK)
60	P25/SDA0	MPEG_IIC_DATA	I/O	Terminal IIC BUS for MPEGu-con. (DATA)
61	P24/SCL1	IIC_CLK	O	Communication terminal for IC/EEPROM. (IIC BUS Clock)
62	P23/SDA1	IIC_DATA	I/O	Communication terminal for IC/EEPROM. (IIC BUS Data)
63	P22/SCK1	NC	O	Reserved.
64	P21/SO1	NC	O	Reserved.
65	P20/SI1	NC	O	Reserved.

No.	PORT	SIGNAL NAME	I/O	DESCRIPRION
66	P47/RPTRG	VSC_ON-H	O	Reserved.
67	P46/FTOB	VSC_DATA	O	Reserved.
68	P45/FTOA	REC_MUTE-H	O	High output of period to becoming of V.REC.ST-H High from VCR REC demand and VCR PLAY inside.
69	P44/FTID	REEL_S	I	Supply side reel sensor input. The reel is detected whether rotating when the tape running.
70	P43/FTIC	REEL_T	I	Winding up reel sensor input.
71	P42/FTIB	V.REC.ST-H	O	Control terminal for A/V Recording Circuit On/Off. H: At the time of start recording. L: Except the above
72	P41/FTIA	NC	O	Reserved.
73	P40/PWM14	NC	O	Reserved.
74	FWE	FEW	I	The FZTAT writing protecting input (Protect it by "L" input).
75	X2	X2	O	32kHz Oscillation.
76	X1	X1	I	32kHz Oscillation. When reset returns, the presence of 32kHz Crystal is confirmed. It is: There are no 32kHz clock count: It counts the clock with 10MHz.
77	_RES	_RESET	I	Reset input.
78	OSC1	OSC1	I	10MHz Oscillation.
79	Vss	VSS	-	GND.
80	OSC2	OSC2	O	10MHz Oscillation.
81	VCL	VCL	I	Flat and smooth-ized capacity connection terminal.
82	MD0	MD0	I	FZTAT writing mode setting input (When "L" is input, it is a writing mode).
83	P34/PWM2	NC	O	Reserved.
84	P33/PWM1	CAP_LIMIT	O	Control terminal for Capstan Motor. (Switching Drive output current)
85	P32/PWM0	NC	O	Reserved. (L output)
86	P31/SV2	NC	O	Reserved. (L output)
87	P30/SV1	NC	O	Reserved. (L output)
88	P70/PPG0	T.IN-POWER_ON-H WAKE UP)	O	POWER ON is directed to the HOST microcomputer by the TAPE IN detection at the POWER OFF state. L: In the following cases, excluding. H: It TAPE IN detects with POWER OFF 〜 Made that receives P. ON command (29H) from MPEG.
89	P71/PPG1	CENT_LED	O	For CENTER LED control L: P.FAIL and PSAVE mode H: Usually CENTER LED is controlled for the power saving. It is assumed L when the P.SAVE mode shifts P.FAIL, and assumes H when returning.
90	P72/PPG2	BOT2	I	BOT is usually invalid for tape IN detection in the low power consumption mode. The state is observed in the low power consumption mode in the state of tape EJECT, and P.ON and tape IN works by the H-->L detection.

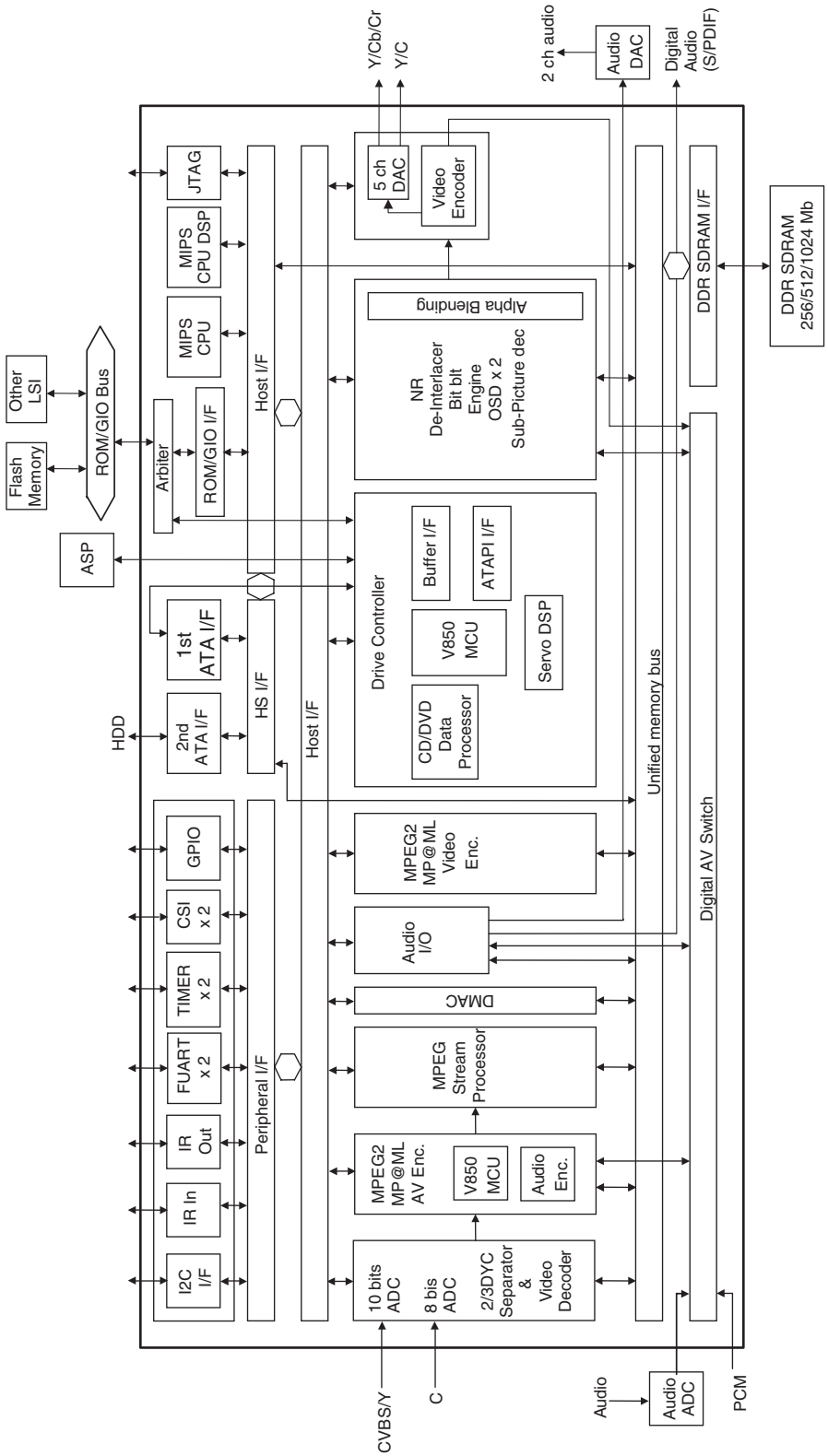
No.	PORT	SIGNAL NAME	I/O	DESCRIPRION
91	P73/PPG3	NC	O	Reserved.
92	P74/PPG4/RP8	NC	O	Reserved.
93	P75/PPG5/RP9	NC	O	Reserved.
94	P76/PPG6/RPA	POWER_MUTE-L	O	POWER, Turn on and off. H: MUTE OFF, L: MUTE ON
95	P77/PPG7/RPB	NC	O	Reserved.
96	P80/YCO	DVD_VSC-H	O	Reserved.
97	P81/EXCAP/YBO	LDM_CTL	O	Control terminal for Loading Motor.(three value control) H: FWD, M: STOP, L: RVS
98	P82/EXCTL	CAP_FWD-L	O	Control terminal for Capstan Motor Driver. H: Opposite direction L: The right direction or STOP or Power Off
99	P83/C.Rotary/R	NC	O	Reserved.
100	P84/H.Amp SW/G	NC	O	Reserved.
101	P85/COMP/B	NC	O	Reserved.
102	P86/EXTTRG	CAP_FULL	O	Control terminal for Capstan Motor. Hi-z: Normal H: At the time of compulsive acceleration
103	P87/DPG	CYL_SPEED_UP	O	The roll correction when Coro SLOW scene is sent righting is done. H: The roll correction outputs "H" pulse to "Z" value. Z: At usually/reset L: When CYL stops POWER OFF
104	DFG	D_FG/PG	I	Drum FG input terminal.
105	VIDEO FF	VIDEO_H.SW	O	Video Head Switch terminal. When the microcomputer resetting, and blacking out, it is. "L" at the POWER OFF.
106	AUDIO FF	Hi-Fi_H.SW	O	Hi-Fi Head Switch terminal. When the microcomputer resetting, and blacking out, it is. "L" at the POWER OFF.
107	DRM PWM	DRUM_PWM	O	PWM output for drum motor control. When it the microcomputer resets, it blacks out, and the motor stops, it is. "L" at the POWER OFF.
108	CAP PWM	CAP_PWM	O	PWM output for capstan motor control. When it the microcomputer resets, it blacks out, and the motor stops, it is. "L" at the POWER OFF.
109	Vpulse	DUMMY.V.SYNC	O	Pseudo V pulse output. H: sink chip and Z: insertion and L at a black level: It is not. When the microcomputer resetting, and blacking out, it is. "L" at the POWER OFF.
110	Vss	VSS	-	GND.
111	Csync	C.SYNC	I	Composite SYNC input terminal. For servoC.SYNC from Y/C is input.
112	Vcc	VCC	-	Power supply terminal.

■ UPD61272F1-107KA3A (SERVICE MAIN ASSY : IC1001)

(EMMA2RFE)

• DVDR IC

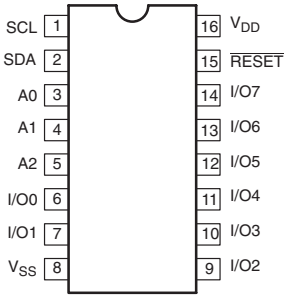
● BLOCK DIAGRAM



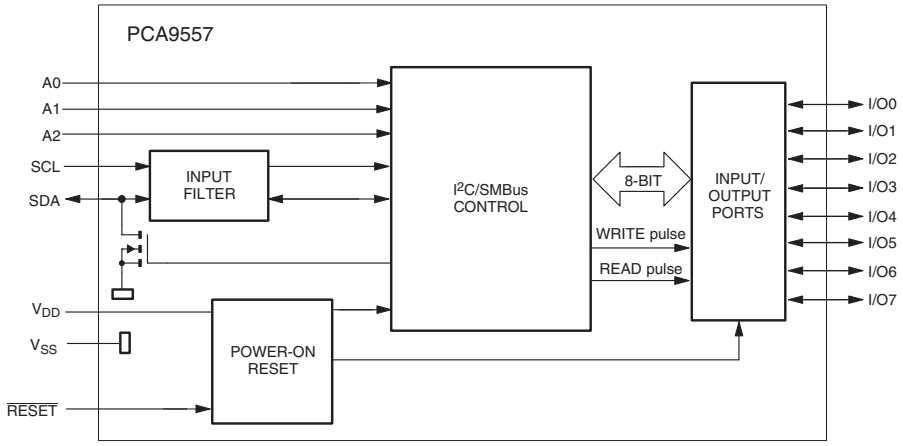
■ PCA9557PW (SERVICE MAIN ASSY : IC3802)

• 8Bit IIC to PARA IC

● PIN LAYOUT



● BLOCK DIAGRAM



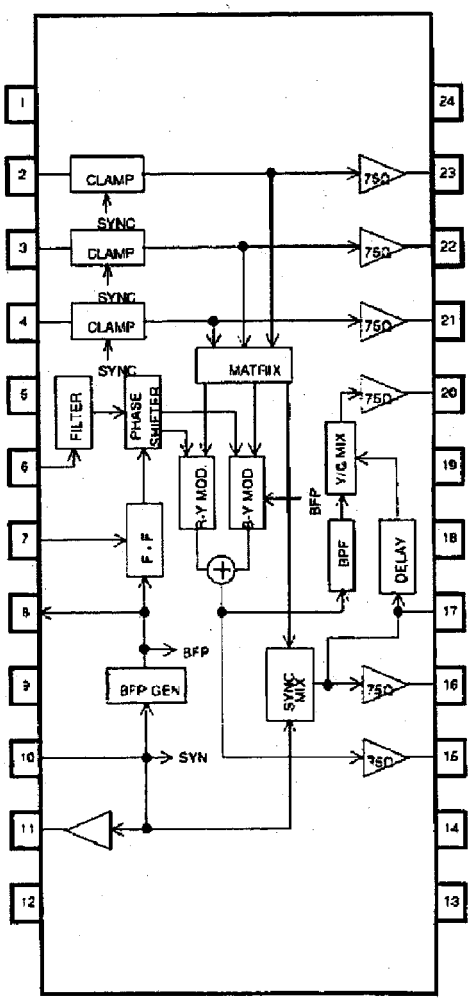
● PIN FUNCTION

Pin No.	Name	Function
1	SCL	Serial clock line
2	SDA	Serial data line
3	A0	Address input 0
4	A1	Address input 1
5	A2	Address input 2
6	I/O0	I/O0 (open drain)
7	I/O1	I/O1
8	V_{SS}	Supply ground
9±14	I/O2±I/O7	I/O2 to I/O7
15	$\overline{RESET}$	Active-LOW reset input
16	V_{DD}	Supply voltage

■ 107F072360(BH7236AF) (AV PCB ASSY : IC8403)

• Color TV Signal Encoder

● BLOCK DIAGRAM



● PIN FUNCTION

Terminal No.	Terminal name	Description of terminals	Termina No.	Terminal name	Description of terminals
1	GND1	Ground terminal except 75Ω driver	13	N.C.	No Connection
2	RIN	Analog Red signal input terminal.	14	N.C.	No Connection
3	GIN	Analog Green signal input terminal.	15	COUT	Chroma signal output terminal.
4	BIN	Analog Blue signal input terminal.	16	YOUT	Luminance signal output terminal.
5	N.C.	No Connection	17	YTRAP	Luminance trap filter terminal.
6	SCIN	Color subcarrier input terminal.	18	N.C.	No Connection
7	NT/PAL	Input terminal for the selection of TV format.	19	VCC2	Power supply terminal for 75Ω driver.
8	BFPOUT	Burst timing signal output terminal.	20	VOUT	Composite video output terminal.
9	N.C.	No Connection	21	BOUT	Analog B signal output terminal.
10	SYNCIN	Composite sync input terminal.	22	GOUT	Analog G signal output terminal.
11	SYNCOUT	Composite sync output terminal.	23	ROUT	Analog R signal output terminal.
12	VCC1	Power supply terminal except 75Ω driver.	24	GND2	Ground terminal for 75Ω driver

7.5 CAUTIONS ON HANDLING THE HDD

(1) Cautions on Handling the HDD

- The HDD is very sensitive to shocks and vibrations. Care must be taken especially during operation (when the power is on).
- The HDD is very sensitive to electrostatic charges.
- Rapid change in temperature or humidity may cause deterioration of the HDD.

Note: After receiving damage caused by any above-mentioned factors, the HDD may operate normally for dozens or some hundreds of hours but then suddenly crash. If you are certain you have damaged a new repair part (HDD) while making repairs, do not use the part.

The HDD is about 10 times as sensitive to shock during operation than during nonoperation.

Reference: Main specifications on damage to the HDD

	During operation	During nonoperation
Shock G (acceleration)	<approx. 20 G	<approx. 200 G
Temperature change	< 15°C/hour	
Moisture change	< 20%/hour	

Reference: Estimate value of falling distance vs. shock (G) when the HDD is dropped without protection

Falling distance \ Landing surface	Granite surface	Concrete floor	Synthetic-resin-coated table	Antistatic sponge
0.5 inch / 12.7 mm	387	217	200	26
1.0 inch / 25.4 mm	595	457	310	37
2.0 inch / 50.8 mm	1133	600	680	70
4.0 inch / 101.6 mm	1795	1040	1050	267

(2) Cautions on handling the product on which the HDD is mounted or the HDD as a repair part, and examples of dangerous handling

[Cautions on handling the product on which the HDD is mounted]

- While the unit is turned on, the HDD is always in operation. Be sure NOT to impart shock to the unit.

● Examples of dangerous handling: while the power is on

- Bumping on the bonnet
- Dropping an object, such as a small screwdriver or remote control unit, onto the bonnet, or bumping an object against the cabinet
- Moving the unit by dragging
- Stacking another product on the unit

Note: Be sure NOT to impart shock, such as bumping or hitting a screwdriver against the HDD, during diagnosis with the bonnet open.

● Examples of dangerous handling: while the power is off

- Imparting strong shock, although the HDD is more resistant to shock when the power is off
- Dropping the unit from a height of several centimeters, or after lifting one side of the unit up, then letting the unit drop.

- Do NOT move the unit immediately after the power is turned off. Wait at least 30 seconds after the indication on the FL display changed from POWER OFF to the clock indication before moving the unit.
  If the AC power cord is accidentally disconnected before turning the unit off, wait at least for one minute before moving it. In this case, damage to the HDD caused by sudden shutoff may be small, because the emergency relief mechanism is activated. However, if sudden shutoff occurrs during recording or playback, recorded data may be damaged. Be sure to check operations.

[Cautions on handling the HDD as a repair part]

1. Handle the HDD in a safe environment:
   - Handle the HDD over an antistatic pad that can also absorb shock.
   - Wear wrist bands to prevent electrostatic charges generated in your body from affecting the HDD.

2. The following must be observed when handling the HDD:
   - Handle one HDD at a time. Do NOT hold several HDDs at the same time.
   - Grip the HDD on both sides so that you do not touch its terminals or circuit boards.
   - Do NOT stack one HDD onto another HDD (even if the HDDs are protected in antistatic bags).
   - Do NOT bump the HDDs against one another.
   - Do NOT bump any tool, such as a screwdriver, or other hard object against the HDD.
   - When a repair part (HDD) is transported and there is a large temperature difference between outdoors and indoors, to the indoor, leave it in its package for about a half day to gradually cool or warm the HDD to room temperature before unpacking it.

[Notes on packing for shipment]

- When returning a defective HDD for analysis, handle with care as if it were a good product. Otherwise, the results of analysis may not be correct.
- When packing, use the antistatic bag and packing materials in which the repair part for service was delivered. Attach a copy of the slip for service or a memo stating symptoms in as much detail as possible.

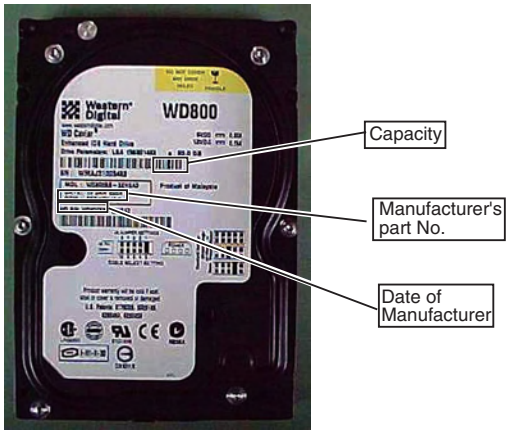
■ Outline and part No. of the HDDs

*Pioneer's part No. is not stamped.

Model Name	Capacity	Western Digital	
		Pioneer's Part No. (for service)	Manufacture's Part No.
DVR-RT602H-S	80GB	VXF1066	WD800BB -xxHJKC

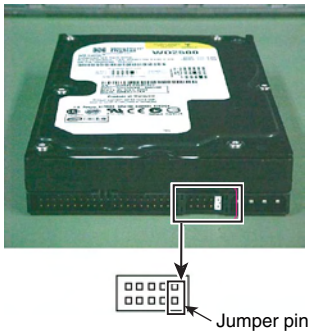
- When replacing the HDD, carefully check the capacity and manufacturer's part No. on the part label to avoid replacing with a similar but inappropriate product. You can also check the model No. of the mounted HDD on the Service mode screen.
- Do NOT use repair parts, such as commercially available HDDs, other than those designated above, as their functions, performance or reliability cannot be guaranteed.

Western Digital(80GB)



■ Confirmation of the jumper pin location of the HDD

Western Digital



Setting : Cable Select(CS)

7.6 KEY TO ABBREVIATIONS

A	A/C	: Audio/Control
	ACC	: Automatic Color Control
	AE	: Audio Erase
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AFT DET	: Automatic Fine Tuning Detect
	AGC	: Automatic Gain Control
	AMP	: Amplifier
	ANT	: Antenna
	A.PB	: Audio Playback
	APC	: Automatic Phase Control
	ASSY	: Assembly
	AT	: All Time
	AUTO	: Automatic
	A/V	: Audio/Video
B	BGP	: Burst Gate Pulse
	BOT	: Beginning of Tape
	BPF	: Bandpass Filter
	BRAKE SOL	: Brake Solenoid
	BUFF	: Buffer
	B/W	: Black and White
C	C	: Capacitance, Collector
	CASE	: Cassette
	CAP	: Capstan
	CARR	: Carrier
	CH	: Channel
	CLK	: Clock
	CLOCK (SY-SE)	: Clock (Syscon to Servo)
	COMB	: Combination, Comb Filter
	CONV	: Converter
	CPM	: Capstan Motor
	CTL	: Control
	CYL	: Cylinder
	CYL-M	: Cylinder-Motor
	CYL SENS	: Cylinder-Sensor
D	DATA (SY-CE)	: Data (Syscon to Servo)
	dB	: Decibel
	DC	: Direct Current
	DD Unit	: Direct Drive Motor Unit
	DEMOD	: Demodulator
	DET	: Detector
	DEV	: Deviation
E	E	: Emitter
	EF	: Emitter Follower
	EMPH	: Emphasis
	ENC	: Encoder
	ENV	: Envelope
	EOT	: End of Tape
	EQ	: Equalizer
	EXT	: External
F	F	: Fuse
	FBC	: Feed Back Clamp
	FE	: Full Erase
	FF	: Fast Forward, Flipflop
	FG	: Frequency Generator
	FL SW	: Front Loading Switch
	FM	: Frequency Modulation
	FSC	: Frequency Sub Carrier
	FWD	: Forward
G	GEN	: Generator
	GND	: Ground
H	H.P.F	: High Pass Filter
	H.SW	: Head Switch
	Hz	: Hertz
I	IC	: Integrated Circuit
	IF	: Intermediate Frequency
	IND	: Indicator
	INV	: Inverter
K	KIL	: Killer
L	L	: Left
	LED	: Light Emitting Diode
	LIMIT AMP	: Limiter Amplifier
	LM, LDM	: Loading Motor
L	LP	: Long Play
	L.P.F	: Low Pass Filter
	LUMI.	: Luminance
M	M	: Motor
	MAX	: Maximum
	MINI	: Minimum
	MIX	: Mixer, mixing
	MM	: Monostable Multivibrator
	MOD	: Modulator, Modulation
	MPX	: Multiplexer, Multiplex
	MS SW	: Mecha State Switch
N	NC	: Non Connection
	NR	: Noise Reduction
O	OSC	: Oscillator
	OPE	: Operation
P	PB	: Playback
	PB CTL	: Playback Control
	PB-C	: Playback-Chrominance
	PB-Y	: Playback-Luminance
	PCB	: Printed Circuit Board
	P. CON	: Power Control
	PD	: Phase Detector
	PG	: Pulse Generator
	P-P	: Peak-to Peak
R	R	: Right
	REC	: Recording
	REC-C	: Recording-Chrominance
	REC-Y	: Recording-Luminance
	REEL BRK	: Reel Brake
	REEL S	: Reel Sensor
	REF	: Reference
	REG	: Regulated, Regulator
	REW	: Rewind
	REV, RVS	: Reverse
	RF	: Radio Frequency
	RMC	: Remote Control
	RY	: Relay
S	S. CLK	: Serial Clock
	S. COM	: Sensor Common
	S. DATA	: Serial Data
	SEG	: Segment
	SEL	: Select, Selector
	SENS	: Sensor
	SER	: Search Mode
	SI	: Serial Input
	SIF	: Sound Intermediate Frequency
	SO	: Serial Output
	SOL	: Solenoid
	SP	: Standard Play
	STB	: Serial Strobe
	SW	: Switch
	SYNC	: Synchronization
	SYNC SEP	: Sync Separator, Separation
T	TR	: Transistor
	TRAC	: Tracking
	TRICK PB	: Trick Playback
	TP	: Test Point
U	UNREG	: Unregulated
V	V	: Volt
	VCO	: Voltage Controlled Oscillator
	VIF	: Video Intermediate Frequency
	VP	: Vertical Pulse, Voltage Display
	V.PB	: Video Playback
	VR	: Variable Resistor
	V.REC	: Video Recording
	VSF	: Visual Search Fast Forward
	VSR	: Visual Search Rewind
	VSS	: Voltage Super Source
	V-SYNC	: Vertical-Synchronization
	VT	: Voltage Tuning
X	X'TAL	: Crystal
Y	Y/C	: Luminance/Chrominance

7.7 DISC/CONTENT FORMAT

	HDD	DVD-R		DVD-RW		DVD+R	DVD +RW	DVD-RAM
Marks used in this manual	HDD	DVD (VR) *1	DVD (Video)	DVD (VR) *1	DVD (Video) *2	DVD+R	DVD+RW	DVD-RAM *13, 16
Logos	HDD HARD DISK DRIVE	DVD R		DVD RW	DVD RW RW 2	RW DVD+R	RW DVD+ReWritable RW DVD+ReWritable	DVD RAM
Re-recordable / Erasable	●	● *3	● *3	●	●	*3	● *14	●
Editing of recorded programs	●	●	● *4	●	● *4	● *4	● *4	●
Recording of Copy-once protected material	●	● *12		● *12				● *12
Playback in other players/recorders	n/a	*5	● *6	● *7	● *6	● *6, 15	● *8	● *9
Chase play	●							
16:9 and 4:3 program recording	●	●		●				●
Bilingual broadcast recording of both audio channels	● *10, 11	● *11		● *11				● *11

Notes to table

**1 Must be initialized for VR mode recording*
**2 Must be initialized for Video mode recording*
**3 Erasable, but free space does not increase*
**4 Cannot erase sections, edit chapters or use playlist editing*
**5 Must be compatible with DVD-R(VR) playback*
**6 Finalize using this recorder (may not playback in some units)*
**7 Must be compatible with DVD-RW(VR) playback*
**8 Must be compatible with DVD+RW playback*
**9 Must be compatible with DVD-RAM playback*
**10 Only when HDD Recording Format is set to Video Mode Off*
**11 Only when the recording mode is not set to LPCM*
**12 CPRM-compatible discs only*
**13 Take the disc out of the cartridge before use. Only Matsushita and Maxell discs have been tested to work reliably with this recorder. Discs from other makers may become unusable when recorded or edited.*
**14 Erasing a title does not increase the available recording time, nor increase the number of recordable titles left.*
**15 Must be compatible with DVD+R playback*
**16 Depending on the disc, it may have to be initialized before it can be recorded. In this case, initialization will take about 1 hour.*

DVD is a trademark of DVD Format/Logo Licensing Corporation.

Using DVD-R DL/DVD+R DL discs

DVD-R DL (dual-layer) and DVD+R DL (double-layer) discs contain two recordable layers on a single side, giving about 1.8 times the recording capacity of a conventional single-layer disc. This unit can record to both DVD-R DL and DVD+R DL discs.

- If you intend to play DVD-R DL (Video mode) or DVD+R DL discs recorded on this unit on other DVD recorders/players, you must finalize them. (Note that some DVD recorders/players may not play even finalized DL discs.)
- Please read the information provided on the disc packaging carefully before purchasing DVD-R DL/DVD+R DL discs:
- *Confirm the disc version:* Use ver. 3.0 / 2 x to 4 x DVD-R discs.
- *Confirm the recording speed :* DVD-R should be compatible with 2 x or 4 x recording; DVD+R with 2.4 x to 8 x recording.
- This logo indicates that the disc is a DVD-R DL or DVD+R DL disc:

DVD R DL 4X/2X RW DVD+R DL

- Correct operation has been confirmed for DVD-R DL discs (Ver. 3.0 / 2 x, 4 x) produced by the following manufacturers: Mitsubishi Kagaku Media, Verbatim (as of March 2005).

About DualDisc playback

A DualDisc is a new two -sided disc, one side of which contains DVD content -video, audio, etc. -while the other side contains non-DVD content such as digital audio material.

The non-DVD, audio side of the disc is not compliant with the CD Audio specification and therefore may not play.

It is possible that when loading or ejecting a DualDisc, the opposite side to that being played will be scratched. Scratched discs may not be playable.

The DVD side of a DualDisc plays in this product. DVD-Audio content will not play.

For more detailed information on the DualDisc specification, please refer to the disc manufacturer or disc retailer.

Other disc compatibility

In addition to DVD, this recorder is compatible with a wide range of disc types (media) and formats. Playable discs will generally feature one of the following logos on the disc and/or disc packaging. Note however that some disc types, such as recordable CD (and DVD), may be in an unplayable format - see below for further compatibility information.

CD-R/RW compatibility

This recorder cannot record CD-R or CD-RW discs.

- Readable formats: CD-Audio, Video CD/ Super VCD, ISO 9660 CD-ROM* containing MP3, WMA, JPEG or DivX files.
  * *ISO 9660 Level 1 or 2 compliant. CD physical format: Mode1, Mode2 XA Form1. Romeo and Joliet file systems are both compatible with this recorder.*
- Multi-session playback: Yes (except CD-Audio and Video CD/Super VCD)
- Unfinalized disc playback: CD-Audio only

Compressed audio compatibility

- Compatible media: CD-ROM, CD-R, CD-RW
- Compatible formats: MPEG-1 Audio Layer 3 (MP3), Windows Media Audio (WMA)
- Sampling rates: 32 kHz, 44.1 kHz or 48 kHz
- Bit-rates: Any (128 Kbps or higher recommended)
- Variable bit-rate (VBR) MP3 playback:Yes
- VBR WMA playback: No
- WMA encoder compatibility: Windows Media Codec 8*(files encoded using Windows Media Codec 9 may be playable but some parts of the specification are not supported; specifically, Pro, Lossless, Voice and VBR)*
- DRM (Digital Rights Management)[1] file playback: No
- File extensions: .mp3, .wma (these must be used for the recorder to recognize MP3 and WMA files - do not use for other file types)
- File structure: Up to 99 folders / 999 files (if these limits are exceeded, only files and folders up to these limits are playable)

WMA (Windows Media Audio) compatibility

The Windows Media® logo printed on the box indicates that this recorder can playback Windows Media Audio content.

WMA is an acronym for Windows Media Audio and refers to an audio compression technology developed by Microsoft Corporation. WMA content can be encoded by using Windows Media® Player for Windows® XP, Windows Media® Player 9 or Windows Media® Player 10 series.

Microsoft, Windows Media, and the Windows logo are trademarks, or registered trademarks of Microsoft Corporation in the United States and/or other countries.

DivX video compatibility

DivX is a compressed digital video format created by the DivX® video codec from DivX, Inc. This recorder can play DivX video files burned on CD-R/RW/ROM discs. Keeping the same terminology as DVD-Video, individual DivX video files are called "Titles." When naming files/titles on a CD-R/RW disc prior to burning, keep in mind that by default they will be played in alphabetical order.

- Official DivX® Certified product.
- Plays all versions of DivX® video (including DivX® 6) with standard playback of DivX® media files.
- File extensions: .avi and .divx (these must be used for the recorder to recognize DivX video files). *Note that all files with the .avi extension are recognized as MPEG4, but not all of these are necessarily DivX video files and therefore may not be playable on this recorder.*
- File structure: Up to 99 folders or 999 files.

DivX, DivX Certified, and associated logos are trademarks of DivX, Inc. and are used under license.

DivX® VOD content

DivX

In order to play DivX VOD (video on demand)

Note

1 DRM (digital rights management) copy protection is a technology designed to prevent unauthorized copying by restricting playback, etc. of compressed audio files on devices other the PC (or other recording equipment) used to record it. For detailed information, please see the instruction manuals or help files that came with your PC (or other WMA recording equipment) and/or software.

content on this recorder, you first need to register the recorder with your DivX VOD content provider. You do this by generating a DivX VOD registration code, which you submit to your provider.

Some DivX VOD content may only be playable a fixed number of times. When you load a disc containing this type of DivX VOD content, the remaining number of plays is shown on-screen and you then have the option of playing the disc (thereby using up one of the remaining plays), or stopping. If you load a disc that contains expired DivX VOD content (for example, content that has zero remaining plays), the message **Rental Expired** is displayed.

If your DivX VOD content allows an unlimited number of plays, then you may load the disc into your recorder and play the content as often as you like, and no message will be displayed.

Important

- DivX VOD content is protected by a DRM (Digital Rights Management) system. This restricts playback of content to specific, registered devices.
- If you load a disc that contains DivX VOD content not authorized for this recorder, the message **Authorization Error** is displayed and the content will not play.
- Resetting the recorder will not cause you to lose your registration code.

JPEG file compatibility

- Compatible formats: Baseline JPEG and EXIF 2.2* still image files
  * *File format used by digital still cameras*
- Sampling ratio: 4:4:4, 4:2:2, 4:2:0
- Horizontal resolution: 160 to 5120 pixels
- Vertical resolution: 120 to 3840 pixels
- Progressive JPEG compatible: No
- File extensions: .jpg, .jpeg, .jpe, .jif, .jfif (must be used for the recorder to recognize JPEG files - do not use for other file types)
- File structure: The recorder can load up to 99 folders / 999 files at one time*(if there are more files/folders that this on the disc then more can be reloaded)*

PC-created disc compatibility

Discs recorded using a personal computer may not be playable in this unit due to the setting of the application software used to create the disc. In these particular instances, check with the software publisher for more detailed information.

Discs recorded in packet write mode (UDF format) are not compatible with this recorder.

Check the DVD-R/RW or CD-R/RW software disc boxes for additional compatibility information.

Dolby Digital

Manufactured under license from Dolby Laboratories. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories.

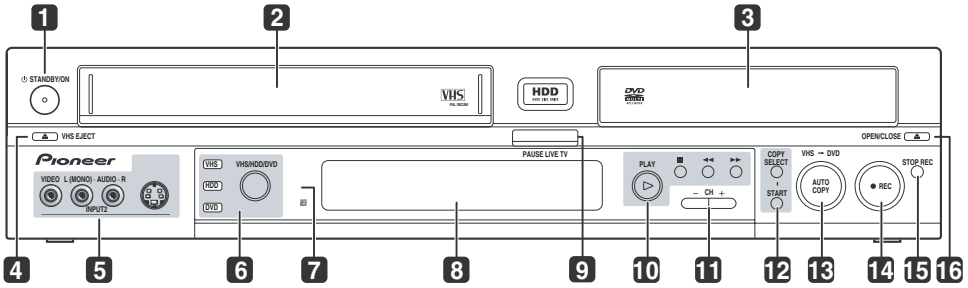
DTS

"DTS" and "DTS Digital Out" are registered trademarks of Digital Theater Systems, Inc.

8. PANEL FACILITIES

8.1 FRONT SECTION

Front panel



1 ⏻ STANDBY/ON
Press to switch the recorder on/into standby.

2 VHS tape slot

3 Disc tray

4 ⏏ VHS EJECT
Press to eject the VHS tape currently loaded.

5 Front panel inputs
The front panel input jacks (audio, video) are especially convenient for connecting camcorders and other portable equipment.

6 VHS / HDD / DVD
Press to switch between VHS, HDD and DVD. The indicators light to show the selected function.

7 IR remote sensor

8 Front panel display

9 PAUSE LIVE TV
Press to start recording the current TV channel, but with playback paused, effectively pausing the broadcast.

10 Playback / recording controls

► PLAY
Press to start or restart playback.

■
Press to stop playback.

◄◄ / ►►
Press to start reverse or forward scanning. Press again to change the speed.

11 CH +/–
Use to change channels, skip chapters/ tracks, etc.

12 COPY SELECT
Use to select the copy mode: HDD↔DVD, HDD↔VHS or DVD↔VHS.

START
After selecting the copy mode, press to start copying.

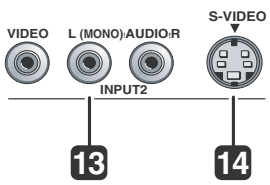
13 AUTO COPY (VHS ↔ DVD)
Use to set the DVD recording mode so that the contents of the VHS tape will fit onto one DVD disc.

14 ● REC
Press to start recording. Press repeatedly to set the recording time in 30 minute blocks.

15 STOP REC
Press to stop recording.

16 ⏏ OPEN/CLOSE (DVD)
Press to open/close the disc tray.

Front panel connections

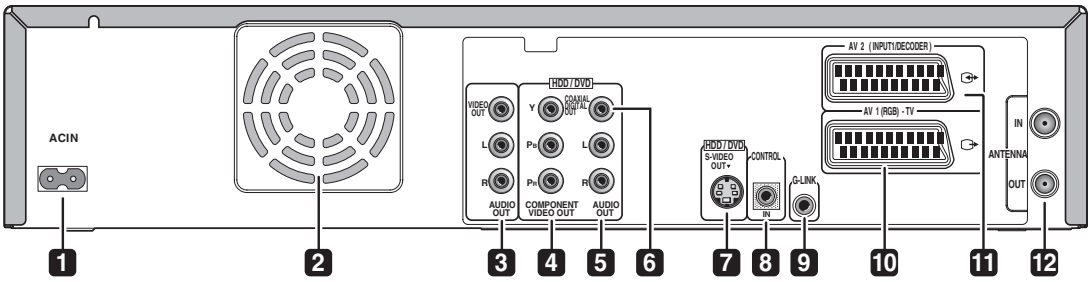


13 INPUT2 VIDEO / AUDIO
Standard video and stereo analog audio inputs, especially suitable for camcorders, game consoles, portable audio, etc.

14 S-VIDEO input
A high-quality S-Video input, especially suitable for camcorders, game consoles, portable audio, etc.

8.2 REAR PANEL section

Rear panel



1 AC IN – Power inlet

2 Cooling fan
Do not obstruct the cooling fan vents.

3 VIDEO / AUDIO OUT
Standard video and stereo analog audio outputs for connection to a TV or AV amplifier/receiver.

4 COMPONENT VIDEO OUT *(HDD/DVD only)*
A high-quality video output for connecting to a TV or monitor with a component video input.

5 AUDIO OUT *(HDD/DVD only)*

6 COAXIAL DIGITAL OUT *(HDD/DVD only)*
Coaxial digital audio jack for connecting to an AV amplifier/receiver, Dolby Digital/DTS/MPEG decoder or other equipment with a digital input.

7 S-VIDEO OUT *(HDD/DVD only)*
A high-quality video output for connecting to a TV or monitor with an S-Video input.

8 CONTROL IN
Use to control this recorder from the remote sensor of another Pioneer component with a **CONTROL OUT** terminal and bearing the Pioneer mark. Connect the **CONTROL OUT** of the other component to the **CONTROL IN** of this recorder using a mini-plug cord. *(Note that the analog audio out jacks should also be connected if using this feature.)*

9 G-LINK™
Use to connect the supplied G-LINKô cable to enable the GUIDE Plus+ô system to **control an external satellite receiver, etc.**

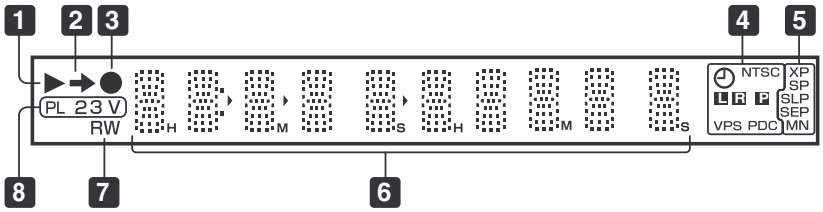
10 AV1(RGB)-TV AV connector
Audio/video output SCART-type AV connector for connecting to a TV or other equipment with a SCART connector. The video output is switchable between video, and RGB (though must be set to Video for VHS output). See page *AV1 Out* for how to set this up.

11 AV2(INPUT 1/DECODER) AV connector
Audio/video input/output SCART-type AV connector for connecting to another video component with a SCART connector. The input accepts video, S-video and RGB. See *AV2/L1 In* for how to set this up.

12 ANTENNA IN (RF IN)/OUT
Connect your TV antenna to the **ANTENNA IN (RF IN)** jack. The signal is passed through to the **ANTENNA OUT** jack for connection to your TV.

8.3 DISPLAY

Display



1 ▶
Lights during playback; blinks when playback is paused.

2 →
Lights when copying. Blinks when copying is paused.

3 ●
Lights during recording; blinks when recording is paused.

4 🕘
Lights when a timer recording has been set. (Indicator blinks if the timer has been set to DVD but there isn't a recordable disc loaded, or the timer has been set to HDD but the HDD is not recordable.)

NTSC
Lights when playing NTSC format video.

L R
Indicates which channels of a bilingual broadcast are recorded.

P
Lights when the component video output is set to progressive scan.

VPS / PDC
Lights when receiving a VPS/PDC broadcast during a VPS/PDC-enabled timer recording.

5 Recording quality indicators

XP
Lights when the recording mode is set to **XP** (best quality).

SP
Lights when the recording mode is set to **SP** (standard play).

LP / SLP
Lights when the recording mode is set to **LP** (long play) or **SLP** (super long play).

EP / SEP
Lights when the recording mode is set to **EP** (extended play) or **SEP** (super extended play).

MN
Lights when the recording mode is set to **MN** (manual recording level) mode.

6 Character display

7 R / RW
Indicates the type of recordable DVD loaded: DVD-R or DVD-RW.

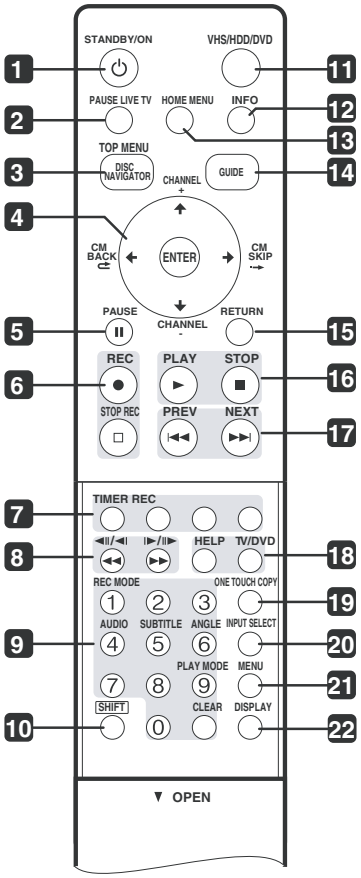
8 PL
Lights when a VR mode disc is loaded and the recorder is in Play List mode.

2 3
Shows the remote control mode (if nothing is displayed, the remote control mode is 1).

V
Lights when an unfinalized Video mode disc is loaded.

8.4 REMOTE CONTROL

Remote control



1 ⏻ STANDBY/ON
Press to switch the recorder on/into standby.

2 PAUSE LIVE TV
Press to start recording the current TV channel, but with playback paused, effectively pausing the broadcast.

3 DISC NAVIGATOR / TOP MENU
Press to display the Disc Navigator screen, or the top menu if a DVD-Video or finalized DVD-R/-RW (Video) disc is loaded.

4 ⬆/⬇/⬅/➡ and ENTER
Used to navigate all on-screen displays. Press **ENTER** to select the currently highlighted option.

The ⬆/⬇ buttons are also used to adjust the manual tracking when in VHS mode

⮌ CM BACK (commercial back)
Press repeatedly to skip progressively backward through the audio or video playing.

⇢ CM SKIP (commercial skip)
Press repeatedly to skip progressively forward through the audio or video playing.

CHANNEL +/–
Press to change the channel of the built-in TV tuner.

5 ⏸ PAUSE
Press to pause playback or recording.

6 Recording controls

● REC
Press to start recording. Press repeatedly to set the recording time in blocks of 30 mins.
When recording to VHS, press ● **REC** and ►**PLAY** at the same time to start recording.

When the red action button is visible in a GUIDE Plus+ô screen, use for One-Button-Record.

☐STOP REC
Press to stop recording.

7 GUIDE Plus+™ Action buttons
When in the GUIDE Plus+™ system, these buttons act as the Red, Green, Yellow and Blue Action buttons (the functions of these buttons change according to the GUIDE Plus+™ Area.

TIMER REC
Hold **SHIFT** and press to set a timer recording from the GUIDE Plus+™ system.

8 ◀◀ ▶▶
Press to start reverse or forward scanning. Press again to change the speed.

◀II/◀I I▶/II▶
While paused, press and hold to start slow-motion playback. Press repeatedly to change the playback speed.

While paused, press to advance a single frame in either direction.

When GUIDE Plus+ô is displayed, use to display the previous/next day.

9 Number buttons, CLEAR
Use the number buttons for track/chapter/title selection; channel selection, and so on. The same buttons can also be used to enter names for titles, discs and so on.

Use **CLEAR** to clear an entry and start again.

REC MODE
Hold **SHIFT** and press repeatedly to change the recording mode (picture quality).

AUDIO
Hold **SHIFT** and press to change the audio language or channel. (When the recorder is stopped, press to change the tuner audio.)

SUBTITLE
Hold **SHIFT** and press to display/change the subtitles included in multilingual DVD-Video discs.

ANGLE
Hold **SHIFT** and press to switch camera angles on discs with multi-angle scenes.

PLAY MODE
Hold **SHIFT** and press to change the play mode (search, repeat, program play, etc.).

10 SHIFT
Use to access functions on the remote printed in green.

11 VHS/HDD/DVD
Press to select the hard disk (HDD), DVD or VHS for recording and playback.

12 INFO
Press to see additional information for the highlighted item in GUIDE Plus+™.

13 HOME MENU
Press to display the Home Menu, from which you can navigate all the functions of the recorder.

14 GUIDE
Press to display the GUIDE Plus+™ screen; press again to exit.

15 RETURN
Press to go back one level in the on-screen menu or display.

Press during VHS playback to set auto tracking.

16 ▶ PLAY
Press to start playback.

■ STOP
Press to stop playback.

17 I◀◀ PREV / ▶▶I NEXT
Press to skip to the previous or next title/chapter/track/folder; or to display the previous or next menu page.

When GUIDE Plus+™ is displayed, use to display the previous/next page.

18 HELP
Press for help on how to use the current GUI screen.

TV/DVD
Press to switch between 'TV mode', in which you get the picture and sound from the TVís tuner, and 'DVD mode', in which you get picture and sound from the recorderís tuner (or an external input).

19 ONE TOUCH COPY
Press to start One Touch Copy of the currently playing title from HDD to DVD (and vice-versa) (page 100) or the currently playing VHS material to HDD.

20 INPUT SELECT
Press to change the input to use for recording.

21 MENU
Press to display the disc menu if a DVD-Video, finalized DVD-R/-RW or finalized DVD+R/+RW disc is loaded.

When in the GUIDE Plus+™ system, use to jump directly to the Menu bar.

22 DISPLAY
Displays/changes the on-screen information displays.

■ Jigs list

Name	Jig No.	Remarks
VHS Alignment Tape (VP_1S-LI6^{3}H)	GGV1222	Hi-Fi Audio (For 4 heads mode)
VHS Alignment Tape (VP_1S-X6^3)	GGV1223	X Value Adjustment (For 4 heads mode)
VHS Alignment Tape (VP_2L-LI1^3)	GGV1224	EP Monoscope, 6kHz (For 4 heads mode)
Adapter	GGF1506	VSR Torque, Brake Torque (S Reel/T Reel Assy)
Dial Torque Gauge (10-90 gf•cm)	GGF1507	Brake Torque (T Reel Assy)
Dial Torque Gauge (60-600 gf•cm)	GGF1508	VSR Torque, Brake Torque (S Reel)
Post Adjustment Screwdriver	GGF1509	Guide Roller Adjustment
X Value Adjustment Screwdriver	GGF1510	X Value Adjustment
Mater Plane	GGF1511	Reel Disk Height Adjustment
Reel Disk Height Adjustment Jig	GGF1512	Reel Disk Height Adjustment
Torque Tape (VHT-063)	GGV1186	Playback Torque, Back Tension Torque During Palyback
Service Remote Control Unit	GGF1381	adjustment, diagnosis
DVD Test Disc (DVD-Video)	GGV1025	Check of DVD-Video
DVD Recorder Data Disc Type2	———— (*)	Diagnosis (ID data setting)
Jig for LD Power Adjustment	GGF1559	LD Power Adjustment
FFC Cable (10P)	GGD1477	LD Power Adjustment
CD-ROM Test Disc	GGV1054	LD Power Adjustment
DVD Dual Layer Test Disc	GGV1036	LD Power Adjustment

(*) Be sure to use the latest disc (Type 2).
In May, 2006, the latest disc is GGV1273.

■ Lubricants and Glues list

Name	Lubricants and Glues No.	Remarks
Grease	GEM1016	refer to "2.3 DECK ASSY(Top)","2.4 DECK ASSY(Bottom)"
Grease	GEM1061	refer to "2.3 DECK ASSY(Top)","2.4 DECK ASSY(Bottom)"
Grease	GEM1062	refer to "2.3 DECK ASSY(Top)","2.4 DECK ASSY(Bottom)"
Grease	GEM1063	refer to "2.3 DECK ASSY(Top)","2.4 DECK ASSY(Bottom)"
Grease	GEM1064	refer to "2.3 DECK ASSY(Top)","2.4 DECK ASSY(Bottom)"

Before shipping out the product, be sure to clean the following positions by using the prescribed cleaning tools:

Position to be cleaned	Cleaning tools
Pickup lenses	Cleaning liquid : GEM1004 Cleaning paper : GED-008

Position to be cleaned	Cleaning tools
Fans	Cleaning paper : GED-008